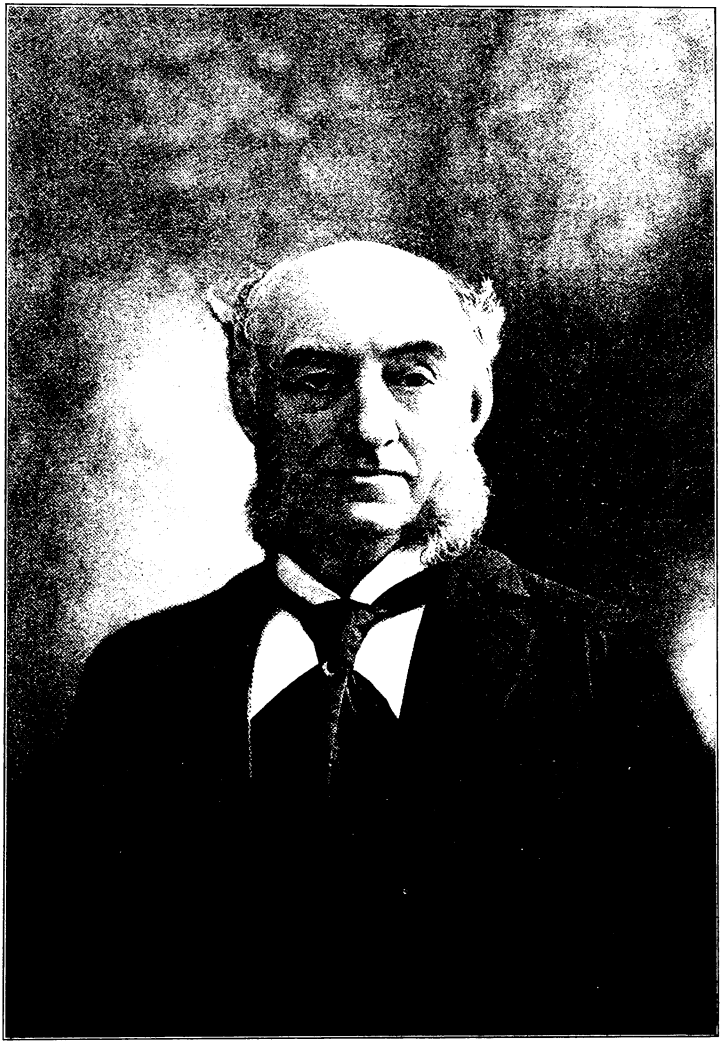


DR. ORVILLE E. HILL.

Studies in Therapeutics.

By W. Clyde Davis, M.D., D.D.S., Lincoln, Neb.

II.

One of the most important drugs belonging to the group of agents acting on the nervous system is gelsemium.

Gelsemium.

The dosage of gelsemium varies greatly in different cases and in the practice of different physicians, ranging from the fraction of a minim to 30 minims. This wide range of dosage as to amount which seems to have its virtues, together with the frequency with which the indications arise, give this agent a place in almost every physician's list.

Indications.

The indications for gelsemium are fever with high degree of nervous tension as is exhibited by bright eyes, usually with contracted pupils, although in some instances the pupils are widely dilated. I have heard that the idea that the size of the pupils serve as an indication for the administration of a certain remedy was without foundation. This however is an error. The size of the pupil is entirely controlled by the ciliary bodies, which are delicate involuntary muscles and entirely under the control of the sympathetic nervous system; hence any lesion which has as one of its main expressions high nervous tension or relaxation of nerve force will show itself in the action of these muscles.

To illustrate look at the pupil of a healthy patient under normal conditions. Now suddenly produce a profound impression upon the nerve center (the brain) by inducing mirth, anger, sorrow or great bodily pain by injury, and the condition of the pupil will be so changed that the observer will need no further argument to admit that this can be considered as a diagnostic feature to be studied. The varied condition of the pupil indicates the change in the nervous tension, and gelsemium is the remedy for a heightened tension, and its remedial virtues are through its inhibitory power over this excessive action of the nerve centers. Further indications are the flushed face, which feels hot to the hand in con-

trast to other portions of the body, showing an unequal circulation with a determination of blood to the head, in all of its tissues.

Uses in General Medicine.

In acute inflammatory affections of all kinds during their first stages of active hyperæmia when the above indications are present, gelsemium is most frequently exhibited.

It is therefore indicated in many fevers, spasms of childhood, peripheral convulsions and fever, spinal, cerebral and meningeal inflammations, chorea, neuralgia, especially of the cranial nerves, rheumatic stiffness of the muscles of the neck, asthma, whooping cough, cardiac neuralgia, palpitation from reflex gastric irritation, acute nephritis from exposure, spasm of bladder, and spasmodic stricture due to nerve irritation. Gelsemium combined with *cimicifuga racemosa* is an excellent remedy for pain so frequently described as "muscular soreness."

Uses in Dentistry.

From its especial action over the cranial nerves it seems to be almost a specific in facial neuralgia when the pain is accompanied with the above symptoms and nervous irritation, determination of blood to the head and flushed face.

In active hyperæmia about the mouth and face, it will be found very efficacious, especially with the dental pulp where due to thermal changes or peripheral irritation.

In combination with hyoscyamus many nearly exposed pulps under recent fillings may be kept comfortable and at the same time prevented from passing on into congestion and further degenerative changes, till self protection is accomplished by functional activity of the odontoblasts.

It may seem that there is no dividing line between gelsemium and aconite, as both have been classed as active hyperæmic remedies. But to make it more clear, gelsemium is the remedy in active hyperæmia due to thermal changes, trauma and nerve lesions, while the symptoms in active hyperæmia calling for aconite will generally be present when the hyperæmia is the initial stage of septic inflammation.

In fevers due to forming alveolar abscess and suppurative empyema of the maxillary sinus some adult patients may require gelsemium in the early stages.

Formulae.

For odontalgia and neuralgia of dental origin:

Tinct. gelsemii,
Ex. hyoscyami, Fl. $\underline{a}$ $\underline{a}$ gtt x

Aqua, $\bar{3}\,\overline{jv}$

Sig. Teaspoonful every hour when in pain. During periods of quiet two doses of a teaspoonful before retiring.

The doses just before retiring are to overcome the tendency of heightening the blood pressure about the head on assuming the recumbent position, which causes so many to complain of pain in tooth pulps.

For inflammations due to absorption of toxines and ptomaines about the head in alveolaritis and antritis:

℞ Tinct. gelsemii, gtt x
Tinct. Echinacea, ʒ ss
Aqua, ℥ j v

Sig. Teaspoonful every hour.

I would recommend this remedy, combined with hyoscyamus for the relief of those exasperating symptoms which arise where pulp nodules are suspected. It seems to be almost a specific in any of the neuralgias of the tri-facial nerve.

(*To be continued.*)

Errors corrected. In the publication of Dr. Davis's article dealing with the uses of aconite, which appeared in ITEMS OF INTEREST for May, several errors occurred, for which reason the formulæ are republished with corrections.

As a liniment in facial neuralgia:

℞
Tincti. aconiti.
Tincti. belladonnæ, aa g tt x
Chloroform, ʒ j
Camphoræ, ʒ j
Aqua, q. s. ℥ j v

Sig. Bathe face over seat of pain till slight redness of skin appears.

For abortive treatment in forming alveolar abscess:

℞
Tincti. aconiti, gtt. x
Tincti. echanacea, gtt. xx
Liquor calcis, ℥ jj
Aqua, q. s., ℥ j v

Sig. Teaspoonful every hour.

For inflammation of tonsils, salivary or mucous glands:

℞
Tincti. aconiti, gtt. x
Phytollaca, ʒ j
Aqua, q. s., ℥ j v

Sig. Teaspoonful every hour or two hours as the case requires.

Dentistry in Central America.

By Dr. WILLIAM WALKERS KRAEMER, Santa Ana, Salvador, C. A.

No doubt there have been a great many articles upon this subject sent to the various journals for publication, but the few that I have chanced to read by no means conform with my views, and in many cases the most glaring exaggerations are to be noted.

It is, I believe, a common opinion among the undergraduates and graduates in the United States that the practice of dentistry in Central and South American countries is as yet not regulated by law. This, on the contrary, is most rigorously looked into by the authorities, and a diploma is required from a reputable college, and also a very strict examining board exists, much to the discomfiture of some graduates of western colleges who have failed to pass during the past five years.

The drawbacks to practicing in these countries is the lack of large towns and quick means of traveling, the usual method being via mule back, and journeys of fifty and seventy-five leagues are not infrequently necessary to be taken, while a journey of twenty-five and thirty leagues is considered an every-day affair.

These journeys would be a source of great pleasure provided they could be taken in any other country, but in these countries the earth's surface is extremely mountainous, and food along the trails is almost impossible to secure, rendering the traveler's position often one of absolute torture, to say nothing of the tropical sun, which is always in evidence.

There are very few cities of twenty-five thousand in Central America, and only two cities of more than that size, and it is a foolish thing for a dentist to think of settling in a town of less than forty thousand, for the reason that there are only about five per cent of the people who are able to pay for dental services, seven-tenths of the population being composed of natives.

Another drawback is the extreme ignorance of the people in general, and it is absolutely necessary for the dentist to have at his command a thorough knowledge of the Spanish language in order to explain himself fully, and also describe the different operations.

Advertising in these countries is of little or no account, and beyond simply a small announcement of your arrival you are throwing away money. If you restore several mouths, and the first two or three patients are satisfied with your work, they immediately become your advertising medium, and your success for a few months is assured. I say a few

months, because inside of four or five months you work out a town of thirty thousand and are ready to travel further.

The native dentists, as a rule, are very jealous of their American brethren, and usually throw any obstacle in their way which they have at their command, and woe to the dentist who has the misfortune of a swelling after an extraction. The whole Republic knows of it.

The prices for services rendered are slightly in advance of the prices paid in the United States, but by no means enough to pay for the risk a man incurs by being exposed to all kinds of infectious diseases, of wars, etc., and eating the vilest kind of food, usually corn bread and a kind of bean grown here, commonly termed "free holdies" in the smaller towns; this with a little fruit constitutes the whole diet, breakfast, lunch and supper, every day and year after year.

It is said the representative of one of the Republics in Paris, after living on this diet for forty years, complained very bitterly of being unable to secure anything to eat in France.

All in all, the practice of dentistry in Central America, as I have found it, is by no means a bed of roses. Duties, customs and expenses are terribly high, and it is necessary for the dentist to have a large stock of material, etc., always at hand, as the nearest market is three months away, and your neighboring native dentist will not sell you anything; usually he would not have it.

In the foregoing sketch I have tried to picture the situation as it really is, and I think if any one has any doubts upon the subject, my statements will be verified by any American dentist here, or who has in former years practiced here.

A Plea for Porcelain Floors in the Operating Room.

By O. W. Randall, D.D.S., Port Huron, Mich.

The average dental operating room is furnished with but little attention given to the feature of cleanliness. Why should dentists not use a tile floor similar to those used in the operating rooms of all hospitals? It is always clean, because every bit of dirt shows up plainly, necessitating keeping it clean; it can be rendered sterile by any sterilizing agent, for it can be scrubbed with even ammonia or acids without harm. Even ink will not penetrate it. Occasionally a bottle of medicine will be spilled, or a pellet of cotton saturated with medicine dropped; if it be of the essential oils, iodine or creosote on the ordinary wool rug or carpet or hardwood floor, days or weeks may elapse before the odor is entirely eliminated.

With a porcelain floor it can be thoroughly washed and every trace immediately removed. Contrary to the general impression, a floor of this kind is not tiresome to stand on if the usual precaution is taken that is observed by dentists with the ordinary floors, viz., either wool or rubber rugs to stand on; in fact I have long ago discarded even these, and use simply rubber heels on my shoes. The appearance of such a floor is pleasing to the eye, aside from the fact that the strictest requirements of modern surgery are being complied with. Patrons are immediately impressed with the fact that it is a correct scientific principle, and this predisposes them in your favor. The life of a rug or carpet is only a few years, when it must be replaced; a few renewals would soon equal the cost of a porcelain floor, and it will last a lifetime and be a pleasure and satisfaction every moment of that time. A small right-angle bur, tiny screws or nuts, fine wires for hypodermic needles and such things have an exasperating way of disappearang on ordinary rugs or floors, only to be found later at the expense of time, trouble and temper. On a porcelain floor anything can be found with the greatest ease, as the shadows call attention to it at once. No other floor can be so sweet, clean and aseptic; no other floor covering so thoroughly fulfill every sanitary requirement and not have a single objectionable feature.

I believe if we are to succeed as doctors of dental surgery we must comply more closely with the essentials of surgery as taught today, the basic principle of which is cleanliness, not only at the specific point of operation, but in our entire surroundings. I believe in the dental practice of the near future strict attention will be given to sterilizing not only the instruments, but so far as possible the operating room and furnishings, and asepsis will play a most important part in the prevention and successful treatment of pathological conditions.

The Band and Dowel Crown.*

By HART J. GOSLEE, D.D.S., Chicago, Ill.

CHAPTER IX.

(Continued.)

Application of Partial Bands: Comparative Advantages, Indications, Procedure. Application of Riveted Facings: Procedure, Riveting. Application of Detachable and Replaceable Facings: Advantages Claimed, Advantages Considered, Advantages Obtainable, Various Designs; Mason's Facing; Application. Roach's Facing; Application. Dwight's Facing; Application. Bryant's Method: Application; Box Method, Tube Method. Davis Crowns. Application to Bicuspids and Molars: Indications; Bicuspids, Molars. Procedure; Re-enforced Cap, Use of Two Dowels, Bite and Impression. Use of Flatback Facing, Facing, Cusps, Adaptation, Approximal Restoration, Investing, Soldering. Use of Saddle-Back Teeth: Procedure. Use of Vulcanite Teeth. Application of Removable Crowns. Application to Irregularities: Indications; Malposition, Construction, Extension for Support of Facing, Hygienic Considerations. Diminution of Normal Space; Separation of Teeth; Application of the Interdental Band; William's Method, Application; Cigrand's Method, Application.

Application of Partial Bands.

The application of a partial band encircling only the approximal and lingual surfaces of the root is advocated and employed more or less frequently in the construction of dowel crowns, as a means of avoiding the presence of a labial band, from an esthetic standpoint, and of precluding its possible irritating influence, as a prophylactic measure.

Comparative Advantages. A consideration of the comparative advantages leads to the conclusion that, while a band encompassing the entire circumference doubtless adds greater stability to the attachment of the crown, affords a more perfectly hermetical sealing of the end of the root, overcomes the possibility of fracture, may be made practically invisible, and will not necessarily prove a source of irritation, providing that it *fits,* the *partial* band, if well adapted to the *lingual* and *approximal* surfaces, fortifies the attachment against stress in the direction from which stress is exerted, makes it possible to bring the facing into *absolute* and *direct* contact with the tissue, and precludes *any* irritation at this point, or the conspicuous and objectionable appearance of the band in the event of subsequent recession of the tissue.

Indications. The indications for the application of this mode of construction are more or less *general,* but depend much upon personal experience and preference, combined with a careful observation of the particular requirements of the case under treatment.

Of special indications, the most favorable are those cases where the root is sufficiently strong to insure permanent support to a crown; or where the labial portion of the root may have been destroyed to the border of the alveolus; where the extreme shortness of the crown, or the thinness and transparency of the tissue surrounding the root, would likely show the presence of the band; where recession of the gums has exposed the labial portion of the root; and where pathological conditions already exist, or the tissue may seem to appear particularly susceptible to any possible irritating influence.

Procedure.

While several methods of securing the desired adaptation are employed, the most positive and accurate results may be obtained by following the same detail of procedure indicated for a circular band, up to and including its fitting, shaping and trimming, as previously outlined.

When the band has been thus fitted and trimmed, a floor of platinum or pure gold, about 34 gauge, should be first simply attached to the lingual *surface* by the *partial fusion* of a small piece of solder. The floor should then be adapted closely to the entire edge of the band, and a precautionary measure observed to prevent their union with solder along that edge of the band which is to be subsequently cut away. To accomplish this, such portion of the joint between floor and band should be filled with a solution of whiting, or occupied by a *thin* piece of *mica* (Fig. 133 A) and the soldering completed around the approximal and lingual surfaces.

The surplus floor metal should be trimmed off on a line with the band, and the labial portion of the latter cut away to the desired point with curved shears, always leaving the edge nicely rounded. (Fig. 133 B.)

When the trimming and finishing of the cap have been completed, it should be adjusted to position on the root, and the projecting labial portion of the floor burnished to a close adaptation to the surface and to the peripheral outline.

The dowel should be fitted and subsequently soldered, and the impression then taken, and the crown completed as already outlined. (Fig. 133 C.)

A method wherein only a *partial* or semi-circular band is fitted to the root instead of a circular one, and where the floor is then attached

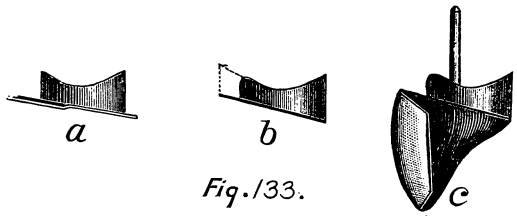


Fig. 133.

and adapted by burnishing, is sometimes employed, but while this requires less time, the adaptation is also less accurate.

Application of Riveted Facings.

Because of the apparent *dread* exhibited by those of limited confidence or experience, towards the process of soldering anything necessarily involving porcelain, for fear of checking it, and of its possible change of color as a result of the application of heat, a method has been devised whereby the occurrence of either or both of these objectionable features might be entirely and positively eliminated.

The process defers the permanent attachment of the facing to the backing until after the construction and assemblage of all the metal parts of the crown, after which it is then securely anchored by *riveting* the pins.

While there are probably no particular objections to this method, neither are any special advantages apparent, except that the facing is held less rigidly, because of the *limited* possibilities of checking facings, which have been previously mentioned in connection with "Soldering," and of the fallacy of a probable change in color resulting from the heat of soldering.

That any perceptible change of color is due mainly to the presence of the *backing, and not to the heat,* is proven in porcelain work, where, when necessarily subjected to a very much higher degree, it is even then the rare and exceptional occurrence; and it would also seem that the impact and vibration produced by subsequently riveting the projecting ends of the pins down close upon the backing would be equally as *"hazardous"* a process as that of soldering.

Procedure.

In the construction of crowns by this method the same general details as previously outlined are observed up to and including the adaptation of the backing.

When this has been accomplished it should be adjusted to position on the facing and finished down as desired, in the usual manner, *except* that the pins are *not* bent to sustain the relation of the two during the process.

Facing and backing together are placed in proper relation to the

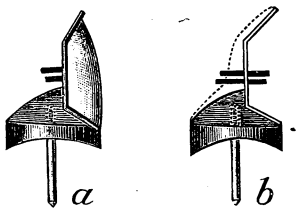


Fig. 134

cap and sealed with a small quantity of hard or adhesive wax in such manner as to securely attach the backing, but to allow the projecting ends of the pins to remain freely exposed. (Fig. 134 A.)

The crown should now be gently removed from the model and the facing carefully detached from the backing.

Small pieces of graphite trimmed from a lead pencil are then closely fitted into the holes in the backing and allowed to project far enough on each side to be securely held by the investment, and to admit of properly forming the lingual contour with solder without being covered over. (Fig. 134 B.)

The remaining incisal portion of the lingual surface of the backing should be covered with wax to keep it clean, and the crown invested. Upon the subsequent removal of the wax the parts should be freely exposed, fluxed, heated and soldered as usual, being careful to note that the ends of the graphite pins are not covered, and that the solder does not penetrate to the under surface of the backing, which is prevented by painting around the pins with whiting.

When the soldering has been completed, the graphite may be broken off even with the surfaces and removed from the holes by the use of a sharp pointed instrument or bur of the same diameter.

The facing should now be adjusted to position and the lingual surface of the crown trimmed to allow a free exposure of the projecting ends of the pins. The holes should then be slightly countersunk with a round bur, the crown roughly finished with stones and disks, and the facing finally adjusted for riveting.

Riveting. As a means of facilitating the process of riveting, and of lessening the liability of fracturing the porcelain, the riveting forceps designed by Dr. Frank A. Brewer, Sr., may be used to advantage; or the crown may be invested, facing downward, in a base of plaster about an inch in depth (Fig. 135)

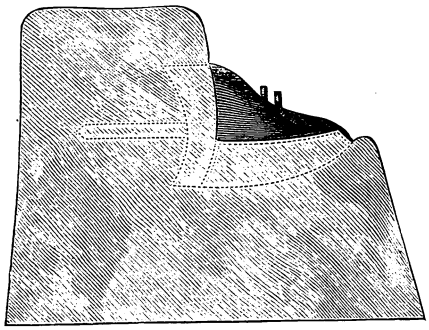


Fig. 135.

and the riveting hammer used. In the latter method the projecting ends of the pins are flattened down over the backing, separately, with consecutive, moderate and well-directed blows from a small riveting hammer. If the crown is properly invested, with a sufficient depth of plaster beneath and supporting the facing, and the whole rests upon a firm seating, this may be done without danger of fracturing the porcelain. The riveted ends are then smoothed down with disks and the crown finished and polished, burnishing the metal up close to the porcelain around the edges.

Application of Detachable and Replaceable Facings.

The not infrequent presentation of broken facings resulting after the permanent mounting of the crown, combined with the more or less difficult operation of replacing them in a secure and artistic manner, has resulted in the introduction of various means for overcoming the former and simplifying the latter.

Several varieties of detachable and replaceable facings are designed for this purpose, and are applicable to the construction of dowel crowns as well as bridgework, though perhaps more generally so to the latter.

While, as a usual thing, it must be granted that the subsequent fracturing of a porcelain facing is due to one of two causes, i. e., either faulty adaptation of the backing, wherein it affords insufficient strength or inadequate protection, or a total disregard of the requirements of occlusion, the use of a style which is easily replaceable is doubtless an advantage in some instances.

When these common faults in regard to backing the facings are combined with the severe strain to which the porcelain is often subjected in some conditions of occlusion, and the perhaps unnecessarily rough usage sometimes unconsciously accorded them, any practical means of facilitating repair in the event of accident is materially useful.

Advantages Claimed. The advantages claimed by the advocates of this style of facing are: First, that the porcelain is not subjected to the heat of soldering; second: facings may be more easily replaced in the event of becoming fractured; third: the probability of becoming fractured from usage is greatly diminshed because the facing is not so rigidly attached to the metal backing; fourth, the color is not changed.

Advantages Considered. The *first* point made is practically the *weakest,* because the fracturing of a facing during the process of soldering it to any kind of an attachment is inexcusable, and can be invariably attributed to either a lack of skill or a neglect of detail.

The *second* must be regarded as problematical, at least in the manner in which these facings are ordinarily used, for the reason that it is often impossible to properly adapt any style or kind of facing to the individual case without considerable grinding.

For this reason also the subsequent replacement of even an exact duplicate of the same mould would occasion the necessity for grinding the latter to an accurate fit and adaptation with the stationary backing, and to meet the esthetic requirements, which, irrespective of the manner of attachment, is not usually an easy or simple procedure.

The *third* feature presents the most practical and plausible advantage, because a porcelain facing supported by mechanical means supplemented with an intervening medium such as gutta percha, or even cement, which affords a somewhat cushion-like effect, will withstand greater stress than one held firm and rigid. Hence fracture is, of course, less likely to occur since the facing will yield slightly to stress before breaking.

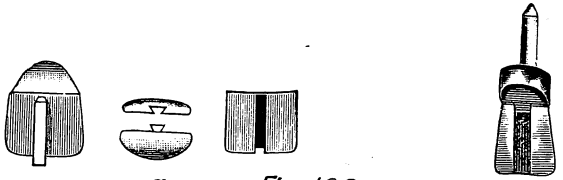
The *fourth* point of advantage is doubtful, for the reason that any

change of color is usually due to excessive heat, or the presence of the backing, as has been previously mentioned.

Advantages Obtainable.

If the highest advantages are to be obtained in the use of this style of porcelain facing, the adoption of a method suggested and practiced by Dr. F. T. Van Woert and others will be found most practicable.

This consists of properly grinding and adapting two or more facings of the same color and mould, as the conditions of occlusion may seem to indicate, for each case at the time of construction. Those not used in completing the crown are then placed in small boxes or other convenient receptacles and labeled with the patient's name. In case of breakage occurring at any subsequent time, a duplicate requiring no fitting or grinding, and which may be readily adjusted to position, is conveniently obtainable.



a Fig. 136. b

While such a procedure may involve considerably more work at the time, much may often be saved in the long run, and particularly in difficult cases, where much grinding is necessary.

Various Designs.

Of the various designs of detachable facings now procurable, the demand has seemingly not justified the adoption of any one special make in preference to the others, nor their extensive manufacture in any great variety of moulds and colors.

Mason's Facing.

The design of removable or detachable facing devised by Dr. W. L. Mason, of Red Bank, N. Y., is probably the most extensively used. It consists of a heavy gold backing having a triangular *slot* through the center and a facing with a projecting corresponding triangular platinum *bar* extending longitudinally, through the center, which readily telescopes into the slot in the backing. (Fig. 136 A.)

These facings are obtainable in a fairly good variety of moulds and colors, and the principle of attachment is secure and admits of easy adjustment. The objectionable features lie in the seemingly excessive proportion of platinum baked in the porcelain, which doubtless weakens the latter by dividing it through the center, and in the necessary thickness at the incisal or occlusal end.

Application. In the application of this style of facing the cap should be completed as prescribed, and the models obtained and mounted upon the articulator. After the selection of the facing its backing should be adjusted and two facings, *in situ,* ground to fit the cap and to conform to the usual requirements. When the desired adaptation is secured the relation to the cap should be sustained by attaching the backing to it with hard or adhesive wax, and the facing then detached, which is facilitated by a projecting end of the platinum bar at the incisal or occlusal edge. Care should be exercised in securing a close relation between the backing and the cap, in order that any penetration of solder through the joint may be precluded, and this may be further prevented by filling the slot and coating backing with whiting. The metal parts should now be invested and soldered, with due attention to the desired lingual contour.

After soldering, the crown should be finished (Fig. 136 B), and the facing then adjusted to position. The projecting end of the platinum bar

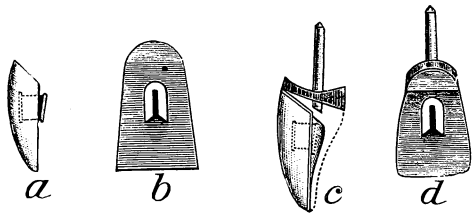


Fig. 137.

should now be cut off and the facing attached to the backing with a thick solution of gutta percha in chloroform, after which the edge should be finished up close to the porcelain, and the crown mounted. Or, if desirable, the setting of the facing may be made after the crown has been attached to the root.

Roach's Facing. A recent design of removable facing has been devised by Dr. F. E. Roach, of Chicago, and for simplicity and strength, combined with accuracy of adaptation, and ready application to either individual crowns or dummies for bridgework, it presents many favorable features. The design consists of a facing with a dovetail lug extending lingually, which is stamped of one piece of iridio-platinum (Fig. 137 A), and a backing with a slotted diaphragm into which the lug fits accurately (Fig. 137 B).

The *lug* is placed vertically in the body of the facing, and, being entirely surrounded by porcelain, affords to the latter a maximum degree of strength, and is set at an angle which admits of easy adjustment to the backing.

The backing is composed of two parts securely united. The outer portion, which is of pure gold, about 34 gauge, is intended to facilitate ready and accurate adaptation to the porcelain, after grinding; and the central portion, which affords the means of attachment, is in the form of a slotted diaphragm, made of 26 gauge clasp metal.

While the principle of attachment is good and secure, the pliability of the outer backing insures a close adaptation to the surface and edges of the porcelain; the gingival extension admits of a close joint between facing and cap, and no excess metal exists at the incisal end to offer obstruction to the occlusion, the merits and demerits of these facings, and their possibilities, range of usefulness and general application are at present uncertain, because of the limited supply and selection procurable.

Application. After constructing the cap and obtaining models, the facing should be selected and ground to place, closely following the method previously outlined with regard to the cervical and incisal preparation. The backing should then be adjusted to place on the facing and burnished to a close adaptation

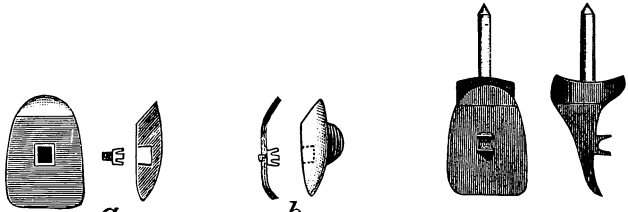


Fig. 138.

with the porcelain, after trimming away all unnecessary surplus around the edges.

The two should then be placed in position on the cap and the relation sustained with hard wax (Fig. 137 C), the facing removed and the metal parts invested and soldered (Fig. 137 D).

After finishing the crown the facing should be attached with *cement*, or gutta percha, and the crown mounted. Because of the extreme thinness and pliability of the backing surrounding the attachment, this style of facing is also applicable to the construction of the shell or telescope crown with porcelain facing, and to bicuspid and anterior dummies for bridgework.

Dwight's Facing. Another design has recently been devised by Dr. W. H. Dwight, of Le Mars, Iowa. This consists of a facing containing a dovetailed platinum socket, which engages the arms of a bifurcated spring post, with threaded shank, which is to be previously attached to the backing (Fig. 138 A).

Application. In the application of this principle the cap should be constructed as indicated, and the models secured. The facing should then be selected and ground to place with the incisal end properly beveled to afford protection. By *heating the facing* and pressing its labial or buccal surface against a small piece of ordinary sealing wax it may be conveniently handled during the process of adaptation.

When the grinding has been completed the spring post should be inserted in the socket of the facing and the end of its projecting shank imprinted in the surface of a piece of pure gold, about 34 gauge, to denote the location of a perforation for its reception.

The perforation should then be made with a punch or small sharp-pointed instrument, and the projecting threaded shank screwed into it until the backing approximates the shoulder of the post. This may be facilitated by leaving the facing attached or by the use of a wrench designed for the purpose. The facing should then be removed (Fig. 138 B), and post and backing permanently attached by the use of a small quantity of solder fused around the line of junction upon the surface to be placed *next to the porcelain,* in order to stiffen and strengthen their union.

The facing is now replaced and the backing burnished and trimmed to a proper adaptation with the porcelain and then placed in position on the cap and the relation sustained with hard wax.

After removing the porcelain the inner surface of the backing should be coated with a solution of whiting and the parts invested, soldered and finished (Fig. 138 C). In permanently attaching the facing to the crown the arms of the post should be expanded until it becomes necessary to use some little pressure in forcing it to place, as they are purposely left slightly contracted, in order to admit of easy adjustment during the process of adaptation.

The facing should then be cemented to place and the crown polished and mounted.

The same principle is also applicable to the replacement of broken facings on crowns otherwise constructed, and will receive subsequent consideration in that connection.

While the details are expeditious and simple, the principle involved in this style of attachment seems weak, from the fact that the mechanical fixation is insecure, and depends much upon the presence of cement for the necessary strength.

Bryant's Method. The method of constructing a replaceable facing, devised and practiced by Dr. Emory A. Bryant, of Washington, D. C., consists of forming a *box* for

the accommodation of the pins as a portion of the backing, and is applicable to any size of the ordinary cross-pin flat-back facings, and to the construction of bridgework as well as single crowns.

Application. In the application of this method the facing should be selected and ground to the proper and desired adaptation, after which it should be backed with pure gold or platinum (34 to 36 gauge), as the requirements of construction may indicate.

Box Method. In the box method a pair of Barnard's parallel pliers, modified by the addition of a set screw and by grinding down the ends of the beaks to approximate the diameter of the pins of the facing, as indicated in Fig. 139, are now accurately adjusted to the relation of the pins, and a strip of platinum, 36 gauge, somewhat wider than the length of the pins, is then wrapped around the points of the pliers, forming a box for the reception of the pins.

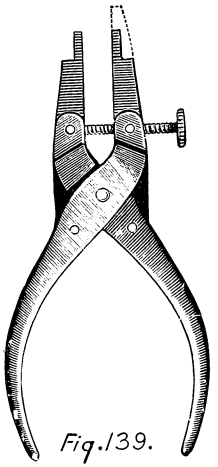


Fig. 139.

After soldering the joint, backing and box are adjusted to position on the facing, and their relation marked with a sharp-pointed instrument, after which they are removed and attached by soldering. The two perforations for the pins should now be extended into one by cutting out

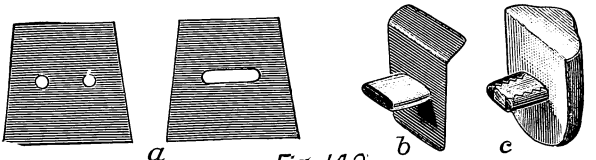


Fig. 140.

the metal between them with a fissure bur of about the same diameter (Fig. 140 A).

This should then be readjusted to position on the facing, and the inner edge of the box, and the ends of the pins trimmed to approximate, and until the projection offers no obstruction to the desired contour or occlusion. A cover of 22 karat gold, about 28 gauge, somewhat larger than the box, is soldered to this edge from the outside, and subsequently trimmed until all surplus is removed, which completes the construction of the backing. (Fig. 140 B.)

The facing should be prepared by slightly serrating the surfaces of the pins which present toward each other, and then filling the space

between them with soft solder, using enough to fill it at least equal to the length and thickness of the pins.

This may be easily done by first fluxing the pins with soft solder flux, placing the soft solder or fusible alloy in position, and carefully directing the flame upon the porcelain, until it takes hold of the pins, after which it should be quickly plunged into cold water to preclude an expansion of the pins, which might cause fracture of the porcelain. Or the facing may be placed on a charcoal block or asbestos pad, pins upward, and the solder fused by carefully directing a small flame upon the porcelain.

This extension of soft solder should be filed down even with the pins on all surfaces (Fig. 140 C), except that the extreme end should remain a shade heavier or thicker, to facilitate the subsequent attachment to the backing with cement.

Facing and backing should be adjusted, placed in proper relation with the cap and temporarily attached with hard wax. The facing should then be removed and the box filled with moistened whiting, and a staple of German silver or iron wire inserted, with the ends projecting about one-quarter of an inch. This prevents the solder from penetrating the interior of the box, and precludes any change in the relation of box and backing during the process of soldering. The parts should be invested, soldered and finished as usual and the facing then mounted with cement.

Tube Method. A similar method involves the like adaptation of a *separate tube* to each individual pin, but as this entails much more work, possesses less strength and affords less opportunities for replacing the facing in case of accident, it has been almost entirely superseded by the former procedure.

The merit possessed by these methods lies in the facility with which a replaceable facing and its attachment may be constructed, and the main advantage in their use may be attributed to the fact that the facing is not held so unyieldingly rigid as if soldered, as previously considered.

Davis Crowns. Among other advantages possessed by the Davis crown is also that of being easily replaceable in case of breakage, but as this style of crown in the various phases of its application will receive due and separate consideration, further reference to it in this connection will be deferred.

Application to Bicuspids and Molars.

The band and dowel style of construction is applicable to the restoration of the crowns of bicuspids and molars as well as to the anterior teeth, but is more generally indicated and more extensively employed upon bicuspids than upon molars.

Indications. While it is especially indicated in *porcelain work,* where the root is necessarily and purposely trimmed to approximate the gingival line, it is also indicated in combination with gold, in order that the work may more closely approach the highest esthetic requirements. In this connection, and in the absence of facilities for doing porcelain work, a facing, or saddleback or rubber tooth may be used with artistic results, and particularly where the shortness of the root demands the employment of a dowel attachment, in preference to restoring its coronal proportions with amalgam, and using a shell or telescope crown.

Bicuspids. The application is more generally indicated and more practical on the bicuspids, because of the necessity for observing higher artistic possibilities, and of the objection to placing gold crowns upon these teeth.

Molars. In the restoration of molars, however, the indications are not so general, and the range of application is more limited, for the reasons that such crowns are usually beyond the range of vision, at least to an extent which greatly diminishes the esthetic requirements; that they are subjected to more vigorous strain in the act of mastication, and that a telescope attachment to a projecting end of the root doubtless affords greater strength and more permanent stability than is usually obtained by cutting the remaining root down to the gingival line and using a dowel attachment.

It is claimed by some, however, that the preparation of a *short* root and the subsequent adaptation of a *narrow* band, with accuracy, is so facilitated as to present advantageous features, as compared with the more extensive preparation of the remaining coronal proportions of the root for the shell or telescope crown.

Yet such a claim reverts to the manner of the execution of the necessary details, and as they must be carefully and skilfully observed in *either instance,* the advantage seems more hypothetical than practical, and the judicious preservation of tooth structure combined with the stability of attachment as applied particularly to the molar teeth, for the reasons mentioned, should precede a consideration of *facility and possible advantages* in the construction.

Procedure.

In the construction of this style of crown, in combination with gold, *two* more or less practicable methods are employed, and they differ only in the style of porcelain facing or tooth used. The cap should be completed as though for an anterior crown, as described, and the dowel fitted and soldered.

Reenforced Cap. Where a heavier and stronger cap than will be afforded by the thickness of the band is indicated or desirable, the same may be obtained by allowing the floor to extend or project about $^1/_{32}$ of an inch from the band, and then filling in until flush and smooth with 22 or 20 karat solder. This will result in a cap possessing good adaptation, a maximum degree of strength and a minimum tendency to produce irritation, such as is frequently indicated in the restoration of bicuspid crowns.

Use of Two Dowels. If the use of two dowels should become necessary to insure sufficient stability, care should be observed to have them inserted at such an angle as to pass into the root readily, and yet project through the floor of the cap at a point at which they will offer little, if any, obstruction to the proper adjustment of the facing. While the surplus ends may be cut away reasonably close

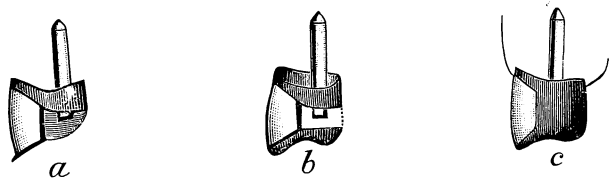


Fig. 141.

to the floor *after soldering,* the longer they may be allowed to remain the greater the strength of their attachment to the crown.

Bite and Impression. The bite and impression should follow in the usual manner, and the models then obtained and mounted upon the articulator.

Use of Flat-Back Facing.

The method perhaps most usually employed involves the use of a flat-back facing and gold cusps, and while this style of construction possesses the advantage of strength, it also presents the objectionable feature of the presence of an occlusal surface of gold.

Facing. The facing should be selected and ground to position on the cap, and the occlusal end then ground to allow for the presence of the cusp, and properly *beveled,* as indicated. It should then be backed up with a single backing of pure gold, about 34 gauge, which should be closely finished down to the

edges at all points, *except* on the *occlusal,* where a slight projecting surplus should remain.

Cusps. Facing and backing should now be placed in position on the cap and sustained with hard wax (Fig. 141 A), while the cusps are being formed and fitted by whatever method selected.

These may be accurately obtained by allowing one or both of the pins to project away from the backing, pouring soft plaster into the space and up against them, and closing the articulator, and then subsequently carving them and securing dies in the manner already outlined. The pins are allowed to project as a means of securely sustaining the plaster during the process. Or the cusps may be obtained from any of the die and die-plate systems.

Adaptation. After swaging, the buccal portion of the gold should be cut away to the occlusal angle on a plane which will admit of approximating it with the edge of the facing and backing. This will leave only the thicknesses of the gold forming the cusp, the backing along the occlusal edge, but the same will afford ample protection to the porcelain, and admits of a more esthetic result.

After thus trimming the cusp to adaptation with the porcelain the two should be adjusted to the cap with wax and adapted to the articulation and occlusion. (Fig. 141 B.)

While all soldering may be done at the time of uniting cusp, facing and cap, it is usually best to remove the *cusp* and *facing* in their proper relation, and previously invest and attach them with a sufficient quantity of 20 karat solder to effect union and fill the lingual portion of the cusps.

To preclude the checking of the facing along the edge, as a result of the impingement of the cusps occasioned by the shrinkage of the solder, a *slight space* should be allowed between the backing and cusps, and this filled with wax to prevent the investment material from running in.

Approximal Restoration. When the parts are securely sustained with wax enough should be further added to form the proper approximal contour to secure a restoration of contact, and a small piece of pure gold, 34 to 36 gauge, should then be *adapted* or burnished to each *approximal* side of the crown, extending from cusp to cap, and held in place with the wax. This forms a matrix which facilitates soldering and gives the desired approximal contour, but should not extend over the lingual portion of the wax, as the solder must be subsequently added from this point.

Foil gold, No. 60 or 120, may also be used for the same purpose, if desired.

Investing. The crown should be invested with a slight covering over and up to the edges of the pure gold matrices to hold them in place, but with the lingual surface freely exposed. When the investment has been properly trimmed, the wax should be carefully picked out and the remainder removed by pouring boiling water upon it, and the parts then fluxed and heated.

Soldering. The soldering should be done by the consecutive application of small pieces of 18 karat solder, of a size suitable to be readily dropped into the opening. Small *globules* of scrap gold and silver are sometimes used to aid in filling in when the space is of considerable size, and the use of the same facilitates the procedure and lessens the extent of shrinkage which would take place in the use of solder alone. The use of globules of German silver or copper is also permissible if they are well and completely covered over with the gold solder.

In finishing, care should be exercised to preserve the approximal

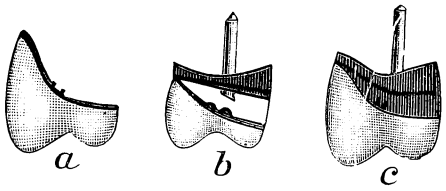


Fig. 142.

contour, in order that contact may be properly restored and the crown then polished and mounted. (Fig. 141 C.)

These crowns are sometimes constructed without cusps, but such practice is to be condemned, except in rare instances, or first bicuspids, because the usefulness of any crown is usually equal in importance to cosmetic effect.

Use of Saddle-Back Teeth.

The variation of method consists in employing the so-called saddle-back tooth instead of the facing, and while this style of construction possesses the advantage of presenting an occlusal surface of porcelain, and thus avoiding any display of gold, the more esthetic result is probably obtained at the expense of strength, as the thin lingual portion of such porcelain teeth is usually inherently weak and more or less easily broken. Where the stress of occlusion is light, however, they may often be used to good advantage.

Procedure. In their application a selection should be made which possesses as broad a neck as will be required to make a perfect joint with the cap, and which will restore the contact with adjacent teeth.

It should then be ground to meet these requirements, and to properly occlude and articulate, after which a single backing of about 34 gauge pure gold should be well adapted, attached by bending the pins, and trimmed to closely follow the edges of the porcelain without overhanging. (Fig. 142 A.)

The proper relation to the cap should now be obtained (Fig. 142 B) and securely sustained with hard wax, and the crown invested in such manner as to have the porcelain covered, but to leave the backing freely exposed.

In soldering, a sufficient quantity of 18 karat solder (in addition to the use of globules of metal, if desirable), to afford ample and adequate contour of the approximal and lingual surfaces, should be used. Fig. 142 C illustrates the finished crown.

Use of Vulcanite Teeth. An ordinary vulcanite tooth may also be employed in similar manner, and in crowns of considerable length sometimes to even better advantage, because of possessing more strength in the lingual cusp, due to the greater body of porcelain surrounding the pins.

In their use the heads of the pins should be compressed between the beaks of pliers, or cut off, and the lingual surface ground smooth to facilitate the adaptation of the backing and the above procedure observed.

Application of Removable Crowns.

Previous to the modern methods of successfully treating chronic alveolar abscesses, the construction of crowns which could be temporarily removed from their attachment to the root and easily replaced was advocated and practiced as a means of permitting and facilitating the necessary therapeutic treatment of roots so affected.

At the present time, however, such practice, for this purpose, has become almost, if not entirely, obsolete, and the application of such crowns is, in consequence, indicated only in the construction of *removable bridge-work;* hence, their indications and usefulness, together with the various methods of construction employed, will be subsequently considered.

Application to Irregularities.

Since some cases and forms of irregularities are not always amenable to the usual process of treatment for their correction, because of the age of the patient, the poor character of the teeth, their position in

the arch, or other physiological or pathological reasons, it sometimes becomes warrantable to sacrifice the natural crowns and effect artificial substitution, which will relieve the disfigurement thus occasioned.

As the radical or injudicious destruction of the natural crowns of teeth must be regarded as presenting a serious aspect, and particularly when involving the anterior teeth, where they are necessarily sacrificed to the gingival line, a careful study of the existing conditions must be made, in order that it may be wisely determined that such a procedure is justifiable.

Indications. The two general classes indicating such treatment as a means of improving both usefulness and cosmetic effect, are those resulting from *malposition,* and a diminution of the normal space caused by *gravitation.*

Malposition.

Cases are not uncommon wherein the malposition of one or more teeth, as previously indicated in Fig. 31, may be best corrected by the application of artificial crowns, but the achievement of successfully artistic

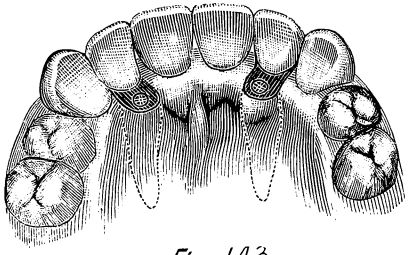


Fig. 143.

and hygienic results in such instances will depend much upon a close observation of the necessary details of construction.

Construction. In the construction of crowns for such, or similar, cases, as illustrated in Fig. 143, the cap and dowel should be adapted to the root, as usual, and the bite and impression taken and models secured.

Extension for Support of Facing. An extension from the cap which will afford a close adaptation to the tissue, and a practically unyielding support to the facing when placed in its proper position of alignment, should then be made by burnishing a piece of pure gold, 34 to 36 gauge, to the model.

When the desired shape and conformation have been obtained, the extension should then be *imbedded into* the model at least equal to its

thickness by first marking the outline and then uniformly scraping the surface.

The cap should then be detached from the model and both cap and extension again placed in position and their relation sustained with hard wax.

The parts should now be removed and invested, and subsequently united with adequate re-enforcement. This can be best accomplished by trimming a piece of clasp metal or 22 karat plate, 28 to 30 gauge, of proper size to rest upon the cap and cover the extension, and then uniting the whole with 20 karat solder.

This should then be replaced in position on the model, and the crown completed in the usual manner.

Hygienic Considerations.

The hygienic qualities possessed by crowns so constructed depend, of course, upon the adaptation of the extension and facing to the tissue upon which they rest; but the burnishing (or swaging, if more desirable) of the extension admits of a close conformation, and the scraping of the surface of the model beneath it and the neck of the facing

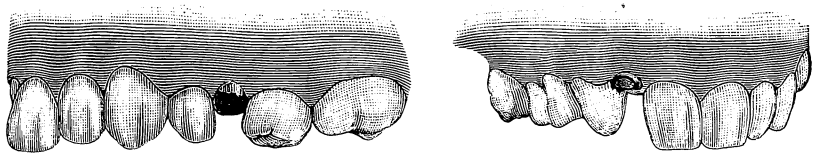


Fig. 144.

so increases the bearing upon the tissue as to usually result in an adaptation of the finished crown which will preclude the lodgment and accumulation of debris.

Diminution of Normal Space.

A condition which is a phase of malposition caused by the natural tendency of teeth to gravitate toward an unoccupied space in the arch is illustrated in Fig. 144, where, from the extensive destruction of the natural crown by caries, the adjacent teeth have moved together, until the space formerly existing in the normal relation is much reduced.

In such conditions, when involving any of the ten anterior teeth, the application of an artificial crown of *adequate and proportionate* size would be impossible, of course, unless sufficient accommodation be previously gained by *separating the teeth*, and such a procedure is indicated, and becomes essentially necessary, if the highest artistic results are to be obtained.

Separation of Teeth. In separating the teeth in such instances the application of a simple regulating appliance may become necessary if any great deal of space is to be gained, and when the desired space has been obtained it may be preserved during the construction of the crown by wedging with a small piece of wood, or by *tightly* packing with gutta percha or temporary stopping during intervals between sittings.

Sufficient separation may often be secured in a more simple manner by trimming and closely fitting a wedge of soft wood, *previously compressed* in a small bench-vise, into the space. If the wood is properly trimmed to follow the outlines of the adjacent teeth, so that it may be worn with some degree of comfort, and then *tightly* fitted into the space, having the surfaces approximating the adjacent teeth slightly concaved to hold it in position, and the grain placed parallel with the long axis of

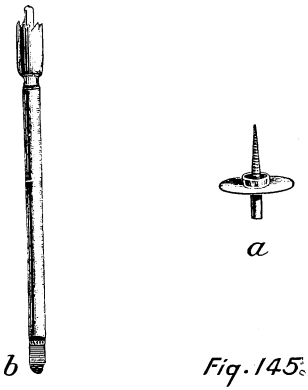


Fig. 145.

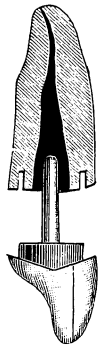


Fig. 146.

the tooth, the absorption of moisture will usually produce an expansion sufficient to create the space desired. This may also be increased somewhat by the use of an intervening layer of cotton or tape when necessary.

Application of the Interdental Band.

For the purpose of avoiding the necessary peripheral preparation of the root and the possible irritating influence of a band, and at the same time securing the additional stability afforded by the latter to the attachment of a dowel crown, the *interdental* band has been devised.

The principle involved is similar to that of the original Büttner crown in which the *periphery* of the root was trephined so as to form a seat for the accommodation of the band. In the application of the interdental

band, however, a *groove* is trephined into the root midway between the pulp canal and the periphery, and a band subsequently fitted into the groove.

The design was probably originally suggested and patented by Dr. Moses Rynear, of New York, in 1886, but subsequent patents have been obtained on modifications of this by Dr. J. Leon Williams, of London, and Dr. B. J. Cigrand, of Chicago, in both of which the principle is the same, but the application and details differ somewhat.

While the advantages claimed by the advocates for this mode of construction are doubtless desirable, they are obtained at the expense of the integrity of the basal portion of the root, and for this reason are indicated only on large, strong roots, entirely free from decay, and will probably never become more generally applicable.

Williams's Method. The design and method devised and employed by Dr. Williams consists of a series of ready-made platinum caps and dowels in graded sizes, together with suitable trephines and root canal drills.

Application. In the application of this style of crown the root is prepared as usual for a dowel crown, without a band. A cap (Fig. 145 A) of suitable and proportionate size is then selected from the series, and the trephine and drill of corresponding size selected.

The canal is first enlarged with the drill (Fig. 145 B) to accommodate the dowel, and the trephine then used to cut the groove for the reception of the band, and the proper relation between the two is secured by the guide post in the center of the trephine. (Fig. 145 C.)

When the cap has been thus closely adapted to the canal and groove, the surplus floor, which is about 34 to 36 gauge, should be trimmed to follow the peripheral outline, and burnished to the desired adaptation with the entire surface of the root.

The bite and impression should then be taken and the crown completed in the usual manner and mounted with cement.

The facility with which these ready-made caps may be secured and adapted to the root in the use of this method expedites the detail of construction, but the band seems too thin and narrow and the dowel too slender to afford adequate strength and stability to a crown of average requirements.

Cigrand's Method. The method devised by Dr. Cigrand constitutes making the band and cap and adjusting the dowel, and the necessary outfit consists of two sizes of trephines and a measurement gauge, as previously illustrated in a consideration of the treatment of *"fractured roots."*

Application. In the application of this method the root is prepared as indicated, and the groove cut as deep as practicable with the trephine of proportionate size. The band is then cut the exact length indicated by the measurement guide for the size trephine used, about one-eighth of an inch wide and of 30 gauge gold, 22 karat, or platinum, made in circular form, the edges abutted, and soldered with a very small bit of solder.

It should then be fitted over the end of the measurement mandrel to give it the proper form, and adjusted to position in the groove by gently forcing to place.

The surplus end extending from the root should be allowed to remain to facilitate removal and filed smooth on a parallel line with the surface of the root. It should then be removed and soldered to a floor of pure gold or platinum, 34 gauge, somewhat larger than necessary, with a minimum of solder.

The edge of the band previously fitted into the groove should now be trimmed away until the floor rests firmly against the root, when in position, after which it should be trimmed and burnished to the proper adaptation.

The canal should now be prepared, the dowel fitted, and then soldered to the cap, as indicated, and the crown completed in the usual manner.

The completed crown and the relation it should bear to the root in both of these methods is illustrated in Fig. 146.

(To be continued.)

The Clinical and Chemical Study of a Case of Dental Erosion.

By Dr. Edward C. Kirk, Philadelphia, Pa.

An address before the Second District Dental Society, March, 1902.

I dislike very much to begin a talk with an apology, but there are two features of this presentation for which an apology is required—one is for the absence of my patient, who was taken ill at the last moment with an acute attack of a disorder which I think is at the base of his mouth difficulty, so that despite his earnest desire to be here, and my desire to have him here, he is bedridden and unable to be present. The second point is that my report is not of a finished investigation, but rather an uncompleted sketch or study of a case of erosion; yet I think it will portray a method of research which will let in some light upon the nature of this disorder.

Previous Theories Relative to Erosion.

In 1886 I had the honor to present before the First District Dental Society a paper upon the etiology of erosion, and among other things I stated in that paper my belief that dental erosion was a constitutional disorder with a local manifestation, and that the local expression was the solvent action upon tooth structure of an altered mucus from certain of the buccal mucus glands; that the nature of the solvent was unknown, but that some constitutional difficulty was back of this local condition, which caused these glands in their abnormal state to exude an acid instead of an alkaline or neutral mucus.

That view has been previously suggested by Professor James Truman, as he had found that in erosion cases the oral fluids at night were distinctly acid, but that during the waking hours, when the flow of saliva from the parotids was active, the acid condition was neutralized by the normal alkalinity of the parotid saliva, and the oral fluids presented no abnormal

reactions to test paper. My study of the subject at that time made me able to localize the places from which the acid secretions entered the mouth.

In 1894 in an editorial reference to this disease I again emphasized my belief that it was closely associated with the gouty or lithaemic diathesis, and suggested that the acid solvent which was responsible for this was probably the dihydrogen sodium phosphate $H_2Na\ PO_4$.

History of a Case.

On January 30 of the present year a patient presented at the clinical service of our department at the University of Pennsylvania. I found his mouth and teeth in an extremely bad state, owing to the activity of a general erosion, and I then determined to make a careful, systematic study of the man's case and particularly of his oral fluids. The patient has been a periodical visitor at our clinic since 1897, and has rather an interesting history. He is an Austrian by birth, is now fifty-four years of age and is a masseur by vocation. He has led a somewhat active life, that is to say, we should not regard him as a man of sedentary habits, as his work necessitates considerable muscular activity and a fair share of walking out of doors.

About 1876 he became a sufferer from periodical attacks of rheumatism, and at about the same time he noticed a peculiar roughness of his teeth. In the course of time the dental trouble became so manifest that he sought professional relief at the hands of the late Dr. J. DeHaven White. I can, of course, only surmise now as to how the case looked at that date, but from what the patient tells me, and from the apparatus that was made for him, I have deduced something as to his condition at that time. The incisor teeth above and below were not in occlusion at all. There was the width of possibly one-sixteenth of an inch between his incisor teeth when the molars were in occlusion. He had apparently had an edge-to-edge bite originally, but this space gradually developed between his upper and lower teeth from loss of their morsal edges. All the surfaces of the teeth in every direction were undergoing solution, giving evidence that the erosion was due to general oral acidity and not localized acidity.

There were none of the peculiar irregularly shaped cavities upon the buccal surfaces with which we are familiar in localized forms of the disorder, but the teeth showed the effects of a general solvent action; they were being dissolved as they probably would be if immersed in a bath of weak acid. The disorder was most pronounced, at the point mentioned, namely, on the morsal edges of the upper and lower incisors, and it was for the relief of that condition, besides other things, that he had applied to Dr. J. De Haven White. Dr. White prepared a "bite piece," as he called it—a little rim of gold which restored the occlusion of the incisors. Apparently from the nature of the

prosthetic appliance (and as the patient remembers it) Dr. White regarded the case as one of mechanical abrasions, that the patient was wearing his incisors down by some peculiar method of grinding them, and to correct the difficulty he put in this little gold bite piece.

When he applied at the University in 1897 he had Dr. White's appliance in his pocket, as it had become useless. He had also another piece from another practitioner, evidently suggested by Dr. White's device and made of cast aluminum with gold clasps attaching it to two or three of the lower molars. Of course you can readily understand that an arrangement of that sort, a cast aluminum piece with gold attachments, two metals of widely differing electropolarity, in a mouth constantly bathed with acid secretions, would have an effect which would delight the heart of Dr. S. B. Palmer. It rendered life miserable for the patient the moment the piece was inserted, and he sought relief from that and his general dental condition at our clinic. The mind of the patient was impressed with the idea that he must have some kind of mechanical appliance to render mastication comfortable. I was not by any means sure that it was necessary, but at his earnest solicitation and to make the man happy, and also to gratify one of our students, who was desirous of making the appliance, I had one made for him of gold.

The patient went away expressing entire satisfaction, and I lost sight of him until he presented for treatment last January. In the intervening time the dissolution of the denture had progressed considerably, the teeth were dissolving away, not only in contact with the prosthetic appliance, but on all of their surfaces, and again I desire to especially impress upon you that this disorder was a case of general acid erosion of the teeth.

I went over his physical condition with some care. Referring to my records, I find that his general health has been, as a rule, good—particularly good until three years ago, at which time he had an acute attack of rheumatism. He had slight attacks of rheumatism before then, but this acute attack was inflammatory rheumatism, which expressed itself particularly in the knees, fingers, hips and feet. He has had an obstinate tendency to constipation for twenty-five years or more, so that he has daily used an enema of water to induce movements of the bowels. He is a periodical sufferer from migraine, headaches and neuralgic attacks, but especially so since the articular rheumatism developed three years ago.

Four years ago, when he was at our clinic it was for the relief of what we have learned to call a "pericemental abscess." He has had several of these acute attacks of suppurative necrotic abscess in the pericemental attachments of two teeth. His present condition is rather a distressing one. He is suffering a great deal of pain, and his teeth are rapidly going. When I came to critically examine his teeth there were

brown spots that seemed to be simply stains of the dentine, but when I applied an excavator it was like cutting into the texture of an old, decayed cork, and the instrument penetrated a considerable distance before solid structure was reached.

Chemical Examination of Oral Fluids.

The immediate problem was to discover the particular agent that was producing this destructive solvent action. My work with Dr. Michaels last summer in Paris led me to hope that possibly an investigation of the patient's oral fluids would reveal something which would be a clue to the cause of the difficulty. That view seemed hopeful for the reason that, believing the erosion to be due to an acid acting upon the tooth structure, one would naturally expect to find in the oral fluids the salts produced as the result of such action. So following out the general line of investigation of Dr. Michaels, I made the routine chemical tests of his saliva, with results that were practically negative, that is to say, there was nothing I could discover which was characteristic or which furnished any clue to unlock the problem as to what was the active solvent at the bottom of the trouble.

I consulted with our professor of chemistry in the Department of Medicine, who, after reviewing the conditions, told me that the problem was one not to be solved by the ordinary methods of qualitative analysis. The result of my consultation and the outlook for a solution of the difficulty were by no means encouraging. Further study of the matter, however, developed a mode of investigation which finally brought fruitful results.

In the first place an examination of a dried and crystallized specimen of the mixed saliva under the microscope showed certain things; that is, under the action of polarized light I was able to make out, with crossed prisms, on the dark field, certain light points. The appearance was similar to what every photographer is acquainted with when he gets those little pin holes or light spots in a negative, or not unlike a miniature view of the heavens on a starry night. I suspected that those were salts that had something to do with the erosion, but the crystals were so small and so uniformly distributed that they meant nothing more than that they represented a polarizable salt in the saliva.

New Method of Examination.

Then the question arose: "How can the crystals be gathered together in such quantity as to make the study of their characteristics possible?" It occurred to me that by means of a dialyzer the crystallizable salts might be separated from the ptyalin and colloid substances and by afterwards concentrating the aqueous solution of dialyzed salts it might be possible to get a crystallization sufficiently characteristic for study.

The plan was carried out. The saliva was dialyzed and the dialysate carefully concentrated over a water bath, and we did get something tangible and characteristic which we were able to study and examine, and finally, by a method which I shall later describe, found exactly what the salt was.

First let me speak of the dialyzing process, and then we can go step by step through the process by which the result was reached.

The dialyzer is a simple piece of apparatus. It consisted in this case of a so-called glass Stender dish such as bacteriologists use (Fig. 1) with a tube about 2x4 cm. passing through a hole in the lid of it, and over the lower end of the tube was tied a piece of animal membrane afterwards immersed in collodion and dried, so that imperfections or possible perfora-

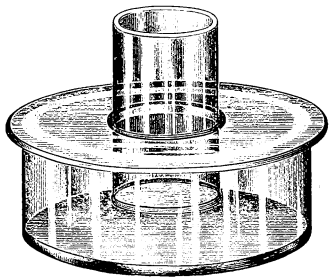


Fig. 1.—Dialyzer for Saliva study, made from glass Stender dish.

tions were completely closed up. In the dish was poured distilled water and the inner tube receptacle filled with saliva. In the course of twenty-four hours practically everything crystallizable in the saliva passed by the process of osmosis out through the membrane into the distilled water, giving an aqueous solution of the salivary salts, which was then concentrated over a water bath to a point where crystallization specimens for microscopic study were very readily made.

We find in making crystallization specimens of saliva that the crystalline form of the salts is modified very much by the presence of mucin and other colloidal substances. This modification makes it difficult for one not having studied the modified forms very thoroughly to be able to identify many of them. The dialyzing process removed that difficulty entirely.

Acid Solvents of Tooth-Bone.

The specimens of salt crystallizations obtained from the dialyzed saliva were remarkably well formed and while perfectly characteristic in form, arrangement and reaction towards polarized light, there yet remained the task of identifying their chemical character. Certain known facts in connection with the case aided in solving the problem of their chemical composition: First, clinical observation of the case from which the saliva was taken established the fact that the teeth of the patient were rapidly being dissolved. Second, that they were being dissolved by an acid, or an acid salt, for we know by experimental test that tooth structure is insoluble in solutions of neutral salts, or of alkalies, at least in any such strength as could be endured by the soft tissues of the buccal cavity. We also know, by experimental test, that teeth are soluble in nearly all acids, even weak organic acids; third, it was a fair presumption that the products of the action of the acid solvent upon the tooth structure in the case under consideration would be found in solution in the oral fluids as combinations of the acid solvent with the mineral bases composing the structure of the tooth. Fourth, the solvent action was due to a general acidity and was not localized upon certain surfaces of a few teeth. Fifth, the acidity was most marked when the parotid secretion was suppressed at night.

The consideration of these several premises suggested the possibility that the acidity was perhaps the result of lactic fermentation. Upon that hypothesis the line of study with a view to its determination was quite simplified, as it would only be necessary to compare the salts found in the dialyzed saliva with those produced by the action of lactic acid upon tooth structure.

The tooth is composed mainly of calcium phosphate with a small proportion of calcium carbonate; some magnesium as phosphate, and some magnesium as carbonate, these being the four substances with which the lactic acid might combine, with the result that there would be formed a lactic acid salt of calcium phosphate or calcium lactophosphate; a lactic acid salt of calcium carbonate or calcium lactate; a lactic acid salt of magnesium phosphate or magnesium lactophosphate, and a lactic acid salt of magnesium carbonate or magnesium lactate.

But lactic acid might not be the solvent. It might possibly be the acid sodium phosphate. Therefore for purposes of comparison all of the compounds which acid sodium phosphate forms with all of the bases in the tooth were made, and, similarly, on the hypothesis that the solvent might be the acid calcium phosphate, a series of its compounds with the tooth bases were produced. Then a tooth itself was dissolved in each one of the suggested solvent substances, so we ultimately had a long series

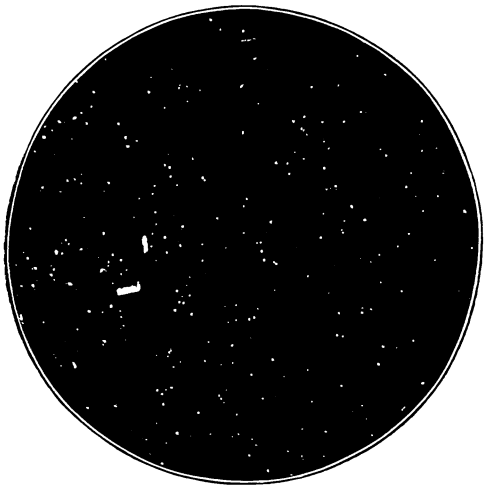


Fig. 2.—Specimen of saliva from erosion case, dried under cover glass, as seen by polarized light.

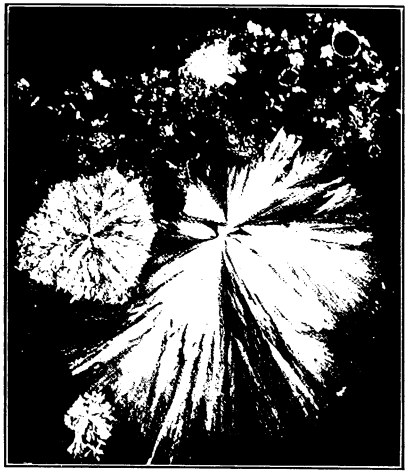


Fig. 3.—Crystallization of salts from dialysate of saliva from erosion case, showing two typal forms.

of standards with which to compare the crystallizations obtained from the saliva.

A comparative study of these compounds with the salts of the saliva, using the micropolariscope, has resulted in finding that the erosion in this particular case is a lactic acid erosion. All the salts are lactates or lacto-phosphates, though I have found evidences of the presence of the acid calcium phosphate, which is an exudate from the gland, and I have found evidences of the presence of sodium acid phosphate. The determination of the solvent in this case and the general nature of the disorder, affecting as it does all of the teeth, would seem to make it necessary to divide our erosion cases into two classes—those in which the erosion is general, in which all the surfaces of the teeth are uniformly involved, in which lactic acid is the solvent acid; and the other class, which is distinctly due to the exudate from an abnormal buccal mucus gland or glands, the acidity of which is due to one of two things—the acid sodium phosphate or the acid calcium phosphate.

Etiology of Erosion.

I have pursued the study of this case only to the point of determining the presence of lactic acid as the active solvent agent. My study of other cases has gone far enough to warrant me in expressing the belief that the localized cases are produced by the abnormal mucus exudate containing either of the two solvents named.

There is an interesting relationship between the production of this acid buccal mucus and the condition of malnutrition which makes the formation of the acid mucus possible. We find the localized erosion in individuals who are the subjects of certain disorders which have been classified as diseases of sub-oxidation; that is to say, in which the processes of metabolism in the body are not carried on in an abnormal way, and in whom as a consequence the blood is loaded with an excess of carbonic acid. The excess of carbonic acid in the blood is to a certain extent taken care of in the excretory cells of the kidney by the mass-action of carbonic acid upon the sodium phosphate of the blood, thus:

$$H_2C\ O_3 + H\ Na_2P\ O_4 = H\ NaC\ O_3 + H_2Na\ P\ O_4.$$

By that reaction two things are formed—the acid sodium phosphate is separated by the kidney and carried off in the urine, and the other product, sodium bicarbonate, is returned to the blood plasma, which later is thus retained at its normal degree of alkalinity. Where, through faulty metabolism, carbonic acid is produced out of normal proportion, as in the gouty diathesis, then not only the kidney, but also the buccal glands take up this same action, and we have the conversion of disodium phosphate into the acid sodium phosphate in those glands, their exudate slowly eroding the teeth.

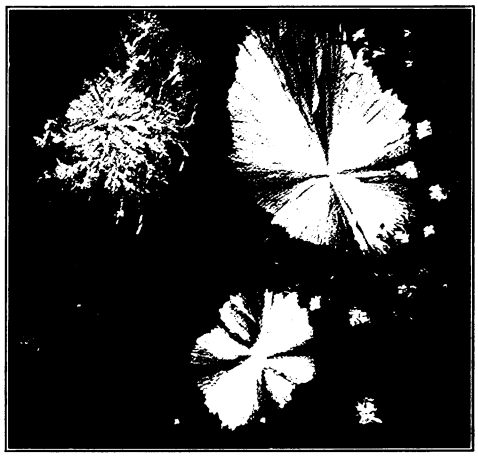


Fig. 4.—Another field from the same specimen as Fig. 3, also showing two typal forms.

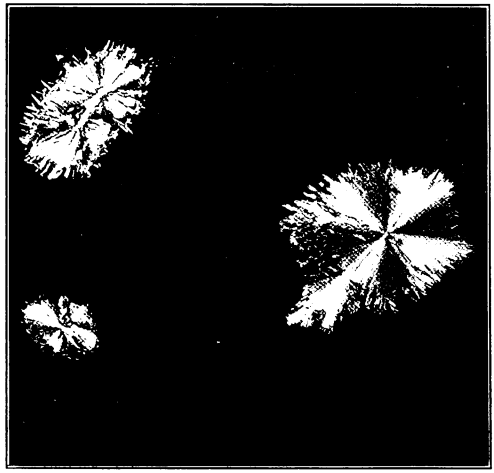


Fig. 5.—Crystallization from solution of a tooth in 1 per cent lactic acid.

The analogy between the action of carbonic acid upon the alkaline sodium phosphate in the blood, and its exudation as acid phosphate by the kidney, and that which takes place in the gland in erosion,* is perfectly clear, and I think we are right in classing the localized forms of erosion as an indication of the gouty diathesis.

I do not wish to convey the idea that erosion is caused by uric acid. We find excessive production of uric acid in these cases, but the uric acid is not the cause of the erosion, but the imperfect metabolism is the predisposing cause of both the erosion and the excessive uric acid production.

Description of Lantern Exhibition.

I will now show you the results on the screen. I want first to speak of the projecting instrument itself. What you have before you is a projecting lantern with a microscope attachment, and in addition an arrangement of prisms of Iceland spar by which we get polarized light. You all know about it, no doubt, but it may be well to refresh your minds. Where a beam of light is passed through certain substances, particularly the substance known as Iceland spar, the light beam is caused to vibrate in one plane only. If we have two such crystals superimposed, and a light beam passing through them, as long as the axes of these two crystals are in the same plane the light will pass through, but if we rotate one of the crystals so that its axial plane shall be at right angles to the other, we cut off all the light.

If then in this condition, with the light cut off and with the axes at right angles, we place in between these two prisms an object which has a refractive index that will cause a refraction so that the beam of light will be so bent that it will pass through the outer crystal; we will have the image thrown upon the screen, so that it may be seen. Also, when the light beam so bent passes through the crystal and out, it emerges with an interference of its component light waves, so that we have the phenomena of color produced in the image.

The first specimen is the dried and crystallized saliva of this case of erosion, just as it appears in the microscope. I am showing you this to show what an unpromising problem it presents to start with. I am not expecting you to see anything. We are using the ordinary ray, and you see a confused mass which may be bacteria or dirt or anything. Now I throw in the polarizing prisms which make the field look like the heavens on a starry night. Fig. II. If you notice it now you will see there are little bright spots all over the field. Dr. Brockway, who is near enough to see and whose word I am sure you will accept, will tell you that he

*As first pointed out by Brubaker, *International Dental Journal*, December, 1894.

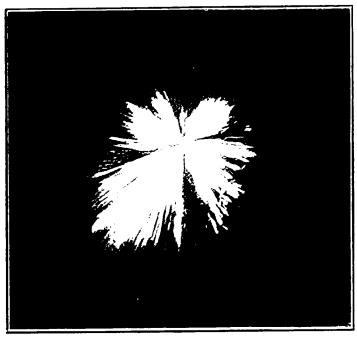


Fig. 6.—Calcium lactate made by action of lactic acid upon pure calcium carbonate.

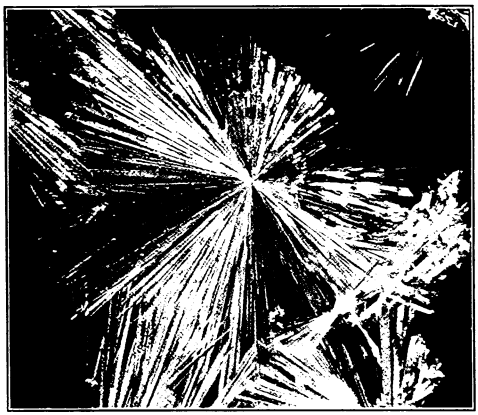


Fig. 7.—Calcium lactophosphate made by action of lactic acid upon pure calcium phosphate.

can see little spots like pin pricks through a dark film, as little light spots on a dark field.

I will now show you what happened after this same saliva was passed through the dialyzer, and after we gathered the salts together in one crystalline group. You will find a different appearance. Figs. III and IV. Now we have something that we can study. I felt at this stage of the investigation very much as Faust must have felt when after the confused and distressed state of mind in which his satisfactory philosophy of life had brought him to, his incantation materialized His Satanic Majesty so that he had him in front of him and was where he could parley with him.

Notice the color effect produced by rotation of the prism, while with the prisms crossed no light passes through except that which passes by refraction through the crystal group. One group looks like a sponge, and another has the characteristic feature of a sheaf of wheat tied together in the center with a band. You will notice the prismatic coloring due to interference of the light waves. There are a variety of colors produced more or less characteristic for the different crystal groups.

The most characteristic thing and the one of greatest interest is that particular form with the sheaf-like arrangement. I want to impress it upon you so if you see it again you will recognize it. All the groups look as though they belonged to the same family, with the exception of the spongy looking arrangement.

Those are the two types. Those I suspected at the beginning, and am now sure, were the saline products of this acid action upon the man's tooth structure. With that belief in my mind I dissolved a tooth in lactic acid, and we shall now see what result was obtained.

Here is a solution of a tooth which has been immersed in a 1 per cent. solution of lactic acid for about ten days and then dialyzed and dried upon the slide. Fig. V. It takes some time, a week or ten days after the slide is made, for the crystal form to develop to its full extent.

That is a characteristic group which is produced by allowing lactic acid to act upon the tooth for a period of say ten days.

I want to show you a larger and more fully developed crystal of that same thing. Here it is. Fig. VI. This is the same salt we saw in the saliva, and when I saw Mr. Gane walk into the room I was very glad, because I wanted some chemist who was familiar with crystal forms to bear me out that that is the same salt. Where the younger groups are forming you see much better the radiating effect of the sheaf of wheat tied in the middle. That is the calcium lactate, which is due to the action of lactic acid on the calcium carbonate in the tooth. The specimen before you is not made from the tooth, however, but from ordinary precipitated chalk,

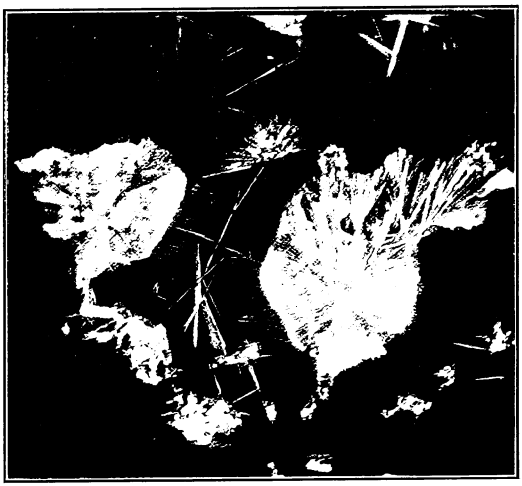


Fig. 8.—Calcium lactophosphate made same as in Fig. 7, showing allatropic crystallization in the spongy form analogous to that shown in Figs. 3 and 4.

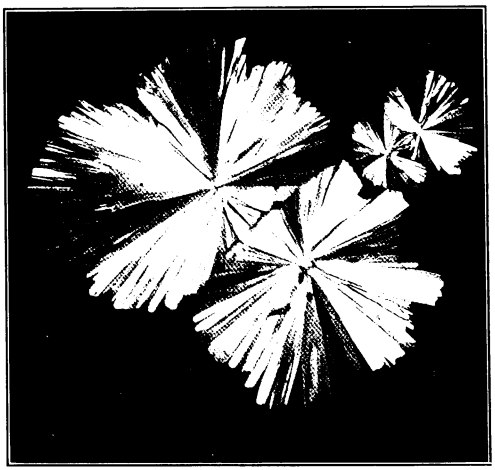


Fig. 9.—Magnesium lactophosphate made by action of lactic acid on pure magnesium phosphate.

so that we have produced artificially the same compound which you saw as the product of tooth dissolution. I think we have by this means demonstrated that the salt you have originally seen in the saliva is the calcium lactate. Figs. VII and VIII.

There is a slight modification of the form when the calcium lacto-phosphate is crystallized. I am not quite sure as to the chemistry of this compound, but when we are dealing with the calcium lacto-phosphate there is a difference of form, although it has a strong typal resemblance with the calcium lactate.

I have also found in this man's saliva the magnesium lactate, but unfortunately the specimens I have are advanced in their crystallization so far that they are not in presentable form for comparison.

I will show you the magnesium compound, Fig. IX, to show how closely it is related in form, but I cannot show it to you in the tooth solution, although I have definitely determined its presence.

If you will notice the terminals of these magnesium lactate crystals you will see they are different. They have the same radiating feature, but they are truncated at the ends. They do not run out into fine needles. The salt is bluish-white under the micropolariscope, whereas all the calcium salts are highly colored. These I have also found in the saliva of this erosion case.

One other thing I want to show you as a conclusion to this matter. I became interested in the study of the salts in this man's urine, which are quite different from anything I have ever seen. They are highly polarizable, and under the polariscope show a different form from any urea salts I have ever seen. I have a suspicion that when this investigation is carried farther we shall find a characteristic and distinct series of crystalline phenomena which will be an aid in the diagnosis of this disorder. The specimen I now show you is put down in the text books on urinology as "urea." I show you this specimen of pure urea that you may see how it is modified from that particular form in the erosion case. I now show you the urea crystallization from the erosion case, and I think you will agree that it is an entirely different thing. It has a family resemblance, but it has a different mode of crystallization, and I believe the urea we find in the urine of these special cases, these gouty cases for example, is modified by the character of the acid present in the urine. I shall leave the subject just at this point.

What I wanted to bring out is that the acid condition of this man's mouth is undoubtedly due to the overproduction of lactic acid and is probably fermentative in character, because we cannot conceive of the human mucous glands exuding lactic acid. It represents a condition of ill health, or malnutrition, which permits such a fermentative process to

go on, and that in the saliva, by this method of dialyzation and the polariscope, we are able to isolate these salts and determine their character quite as accurately as by any method of chemical analysis.

I desire here to express my thanks to Mr. Balderston for the intelligent care and skill expended in the construction of the projecting micro-polariscope by which this demonstration was made possible. My thanks are likewise due to Dr. Francis Ashley Faught, who has been my laboratory assistant throughout this reasearch.

Some Thoughts on the Prevention of Caries.

By SAMUEL A. HOPKINS, M.D., D.D.S.

Read Before the Boston and Tufts Dental Alumni Association.

As you well know, the invitation to address this association came at so late an hour as to preclude the possibility of preparing an original paper for this particular occasion. In place of such a paper, which I should have felt honored in writing for this association had time permitted, I have torn out a few leaves from a little book I have just written on "The Care of the Teeth," and have brought them here to submit them to your kindly interest and criticism. A great deal of what will be said is a repetition of what has been said before. The story is an old one, but if I succeed in making some slight alteration in the dress which clothes the story it may be found sufficiently attractive to hold your interest for a brief space this evening and possibly will be remembered in the busy hours of the morrow.

This is an age of hobby horses, and in turn we ride one after another. Some of the dental hobbies which have been ridden in the past have turned out to be dangerous steeds. Some of those of the present day are hard pullers, and unless they are ridden with a curb and by strong, well-trained men they will take the bit in their teeth and, running away, will dash the rider over a precipice to his destruction. Such a hobby, I fear, is "Extension for Prevention." A splendid animal, but one requiring careful handling. Others are just comfortable hacks that you may ride with safety and with profit, and I trust that the hobby of "Prophylaxis" may always prove to be just such a well-mannered, useful kind of a beast.

In writing and talking as much as I have on this subject I am free to confess that one truth impresses itself upon me more and more, and I fully realize that those who lecture on high ideals may sometimes discourse like angels, but they are very apt to live like men. It is not, however, necessary to give up thinking or talking or living simply because we cannot always keep on the high plane of our best thoughts.

When I speak of preventive measures in dentistry I am sometimes accused of building castles in the air, but if we build castles in the air, who knows but we are building palaces for future generations to live in. If you read for castles in the air high hopes, burning aspirations and splendid ideals, you have only to put in your foundation of practical knowledge, and the dwelling is complete.

The Utopian age when dental operations shall become unnecessary has not been reached, but it is safe to say that in all ages and at all times the best interests of the practitioner will be found to be identical with the best interests of his patient.

In every profession we find that the highest aim of the noblest men is to prevent trouble. The highest type of lawyer is he that best succeeds in preventing litigation. The best physician is that one who has labored hardest to prevent the disease which he is called upon to treat, and the most useful dentist is not one who is content to repair damage and restore loss, but that one who labors unceasingly to prevent such disastrous conditions from occurring.

The uses of teeth are, first, to assist in the articulation of words; second, to give expression and beauty to the countenance, and, third, to masticate food. There are some words which cannot be articulated if the front teeth are wanting, and when all the teeth are lost the voice becomes feeble, thick and indistinct. The monotonous cadence of edentulous old age serves to remind us of the importance of the teeth in articulate speech.

In giving expression to the countenance, no organ or set of organs has greater effect. No man can give the impression of strength or power whose teeth are frail and uncared for. His words are unheeded and his authority weakened as soon as he exhibits a frail and decayed set of teeth. Nothing so quickly rivets attention and causes a feeling of repulsion as uncared for teeth in a woman. How many beautiful women convey a shock and arouse a sense of pity instead of admiration, when they open their mouths. Anything which will heighten the effect of these organs becomes of the first consequence to people of refined society. Solomon, one of the wisest sovereigns of antiquity, whose court was the home of fashion and beauty, makes several complimentary allusions to beautiful teeth, as when he says: "Your teeth are like a flock of

sheep, even shorn, which come up from the washing." Ovid recommends as a remedy against love "to make her smile, who has bad teeth." He also said to a young lady: "I can perceive your attention to the graces by the whiteness of your teeth." "How," said Catullus, in giving the portrait of one of the reigning beauties, "can I describe the beauty of her teeth which she presented to view in the act of laughing? White, equal, closely and compactly placed, they presented in their arrangement the effect of a fine necklace formed of pearls, the most regular and the most brilliant." Lord Chesterfield remarked that "fine and clean teeth are among the first recommendations to be met with in the common intercourse of society," and Levator remarked, "As are a man's teeth, so is his taste."

Importance of Good Teeth.

If the learned philosopher had lived today he might have gone even further and announced without hesitation that strong teeth are essential to the best types of manhood, and that degeneracy of teeth means deterioration of the race. This does not for a moment reflect upon the number of brilliant, kindly and noble people who possess frail, rapidly decaying teeth that are but the precursors of false teeth that follow as age advances. It cannot be denied that great intellectual power is often associated with weak teeth, nor can it be denied that weak and rapidly disintegrating teeth are frequently seen in men of large stature who appear to be healthy and strong, but it can be confidently affirmed that that rare combination of vital power and physical and mental strength which is found in the best athletes, in pioneers and in great leaders of men, is rarely to be seen unaccompanied by strong teeth. To such men good teeth are essential, and to them they are given. That great men have lived, and great deeds have been accomplished in spite of the handicap with which diseased teeth load down the race is unquestioned. We have only to remember the father of our country to satisfy ourselves upon this point. But only great genius and wonderful force can resist the impairment of health and strength which normally follows the loss of teeth. There may be many who will not readily concur in this opinion, for there will flash before each one of us the picture of dear friends and relatives, and of great men and women as well, who have had poor teeth; but careful observation will discover the truth of the general proposition, that the men and women who lead in the world's progress must have strong teeth; that if you would see your children pioneers and leaders in the world's best work you must give them good teeth. Without these, vitality is lowered and force is weakened. That you may strengthen even the weakest teeth and preserve them from much of the decay and loss which often seems to be their natural heritage, I think can be easily shown.

Use of the Teeth Beneficial.

You can render an arm thin and weak by keeping it practically motionless for a few months, or you can make it large, strong and healthy in a comparatively short period by devoting a small proportion of time to daily exercise of a regular and proper kind. The statement is often made that decay is largely dependent upon modern cookery, and the meaning implied is that as food is now prepared it requires little or no chewing, and we have, consequently, lost in a great measure the habit of mastication, and the strength of the masticatory muscles has diminished. When food does not melt in the mouth, we wash it down with a draught of water or tea or coffee, and our children are permitted to do the same. It is no great wonder that the teeth become weak, that the muscles which control the movements of the jaw lose their strength and tone and grow tired if called upon for any prolonged effort. It is not remarkable that the lower jaw retracts and becomes small and narrow when there is insufficient exercise to encourage its development.

In the nursery, or indeed when the child graduates from the nursery and comes to the family table, there is but little food which affords any exercise for the teeth and muscles of mastication, and there is but little advice or encouragement given to induce children to properly chew their food. The average meal for the average child is apt to be a bore, and he hurries through it, washing his food down with water in order to seek a more congenial occupation. The nervous energy of modern life, especially in America, is largely responsible for this condition. Life is so crowded that nervous haste is the rule rather than the exception. Repose is almost unknown, except during the hours of sleep, and even the meal hour is shortened under pressure of other matters. To produce strong teeth is almost as simple a matter as to produce strong arms. It is only necessary to see that the children have at each meal some wholesome article of food that calls for vigorous mastication and to see that it is thoroughly masticated. Exercise causes the blood vessels to take up the waste material which has served to nourish a part, and fresh material is brought to nourish and strengthen it. It is perfectly obvious that no matter how abundant the food supply, no matter how rich the blood may be in nutrient material, no matter how well adapted that nutrient material is to the needs of a given part of the body, yet unless sufficient exercise is obtained the nutrient pabulum will not be taken up because the waste material cannot be expelled to make room for it. This applies equally to the arm or to the teeth or to any other portion of the body.

If, however, the food entering the system be insufficient, or if sufficient in quantity it fails to contain enough nourishment for the

entire body, the condition is much more serious, and that organ or that part of the body which is least used will suffer most from the scarcity of nutrient pabulum. At first glance it would seem as if the contrary were true, but a second thought will establish the correctness of the statement. The nourishment of an organ depends upon the activity of the protoplasm of which it is made up. As the nutrition suitable for a part (even in such reduced quantities that there is not enough to go around) goes coursing through the minute blood vessels of the body, every molecule of protoplasm of which an organ is made up must abstract from the blood the nutritious element which is needed for the organ to which it belongs. Now if by exercise the protoplasm of a part is rendered active it will take up all the nutrition it needs, or at least all that it can get, and if there is not enough for all, the idle protoplasmic cell will be robbed of its entire portion by the more active cell. This explains the importance of exercise. The power of selection or differentiation inherent in the protoplasmic cell is almost as great a marvel as the wonderful mystery of creation itself. From the extremely complicated nutrient pabulum which results from the digestion of food, the protoplasm of a bone selects that which is necessary to nourish the bone; the protoplasm of muscle neglects everything save material needed for muscular development; while the hair and the skin and the teeth have each their own protoplasm selecting the nutriment needed for each particular part.

Some interesting experiments have been made at various times and places by different observers which show plainly the importance of exercise as a factor in nutrition. Animals were fed for a long period on foods deficient in lime salts and were finally killed. Examinations were made of their different bones, and the results were carefully noted. It was found that the bones which had little exercise, such as the bones of the head, showed the effect of the loss of lime salts much more plainly than the active ones. In many instances the fixed bones were so thin that death would have ultimately resulted from their absorption; while the bones in active use showed but little change, they having robbed the blood of all material suitable for their maintenance. Long before birth the work of tooth forming has already begun, and in the secret laboratory of the human body the busy protoplasmic cells of each organ are laboring night and day discarding that which is unfit and selecting that which is useful to the building up of the particular organ of which they are a part. Unerringly the marvelous chemical changes are wrought, and all that nature asks is an opportunity to do her best. Given the raw materials in the shape of wholesome food, given a bountiful supply of oxygen, plenty of sunshine and reasonable and natural exercise with healthy, normal sleep, and provided that ancestral sins are not visited upon the

child in the shape of some inherited diathesis or taint, a healthy child will be developed. Neglect any organ, or let anything interfere to cut off its nutrient supply, and the consequence will follow the child through life.

It is not my purpose to advocate a particular diet, but merely to call attention to the fact that the mere presence of teeth in the mouth cries aloud for such a modification of the diet of the child as will produce in the teeth proper functional activity. Even the little temporary teeth must have a plentiful exercise, since exercise insures a bountiful blood supply, and upon this depends not only their own preservation and usefulness, but also the size and shape of the jaw and texture of the permanent teeth which follow. All are affected by the use or neglect of these tiny teeth. While the jaw is undeveloped and the bone tissue soft it is obvious that it is more susceptible to the various influences which affect its growth than after full development has taken place, and exercise during this period will do much to insure its proper development. The permanent teeth still in the formative period will also profit by the increased nutrition which exercise will bring to the part. If our inertia could be overcome and these young teeth given the modicum of systematic attention which they deserve, dental operations would be reduced to a minimum and the appearance of these little ones would be wonderfully improved. The protruding forehead and the receding lower jaw may indicate intellectuality, but we can never regard them as marks of beauty, nor can we desire them for our children.

If our boasted intelligence is to avail to make life more charming, more beautiful, and more worthy of being lived, it would seem as if its greatest effort should be directed toward the strengthening of the body and the preservation of health. It appears, however, that the very simplicity of the solution has made civilization averse to the consideration of the problem of how to keep well. We have been taught that to be good is to be happy; but the tiresome monotony of happiness procured by this uninspiring regime has led us to risk an occasional indulgence in sin, particularly when we feel that our punishment might be indefinitely postponed if not escaped altogether. The very simplicity of the laws of health engenders a desire to break them, and because the lightning does not immediately follow the thunder, and our breach of the law result in quickly following illness, we are led to take chances with our health that we would never think of taking if our punishment were meted out immediately upon the breaking of the law. We have such sublime confidence in the power of scientific medicine to restore us to our normal condition that we do not feel greatly disturbed at the possible consequences of a breach of the laws of health. Indeed our confidence in the physician

is so great that self indulgence in diet is the rule rather than the exception. In the same way our confidence in the ability of our dentist leads to our neglect of the means by which dental operations may be prevented.

Influence of Proper Food on Health.

Of course the best of all conservators of good health in childhood is tact and good judgment on the part of the parent, together with cheerfulness and a reasonable degree of adaptability on the part of the child. If time allowed it could be shown that natural foods are better suited to the development of the child and more properly adapted to the needs of the adult organism than are foods artificially prepared. Triumphs of modern culinary art, rich sauces and food that melts in the mouth are not usually the ones best adapted to the wants of the body, yet there ought to be no unreasonable restriction in our diet in order to keep it simple, wholesome and well suited to our requirements. A little study will discover a great variety of suitable foods ready for our use, and a little ingenuity will provide infinite and delicious combinations to suit every meal in the year. Provided the diet is all that it should be, in order to get the best results a few simple rules mav be found of assistance. Insist upon the child eating slowly. A young child usually will eat slowly if left to his own devices. If he has acquired the habit of eating rapidly he has probably acquired it either by coming in contact with those who eat rapidly or from being urged to hurry his meal. Think for a minute of the child's first meal at the table. It matters not whether it is in the nursery or at the family table. The child is given a mouthful of food, and, whatever it may be, he ordinarily takes time to chew it and mix it with saliva. His attention wanders from his food after every mouthful and is usually brought back by the nurse, who presents a newly filled spoon to his mouth and urges him to hurry and swallow the food that he is deliberately chewing. It is a long and tedious operation for a nervous mother or nurse to patiently feed a deliberate child, and she is apt to hurry the operation until the child is forced out of the habit of eating slowly and begins to swallow his food without mastication in the effort to adapt himself to the high pressure conditions which are imposed upon him.

A little later, at the family table (and it is regretted that the same conditions prevail at many boarding schools), if the child still retains any degree of moderation in eating, it is speedily destroyed. The breakfast hour is delayed until the very last moment, and the child has but just time to swallow a hasty, ill assorted meal with the assistance of some liquid with which to wash it down, and reach school before the nine o'clock hour strikes. Or if it happens that the breakfast hour is early enough for the child it may be the father who is hurried. He is obliged

to catch a train, or must be at his office at a certain time, and as he comes down to breakfast at the last moment, he is obliged to hurry his meal to accomplish his object. Nothing is more infectious than nervous haste at a meal. One person hurrying to catch a train will infect every one else with the spirit of haste and spoil the meal for every one at the table. Is it any wonder that children living in such an atmosphere of haste learn to eat rapidly and forget to chew their food. They have tried honestly enough to eat slowly, but the habit of hurrying has simply been forced upon them.

Again when children come to the family table the meal, especially the family dinner, is often made a rack upon which they are tortured. The dinner hour is deemed a peculiarly fitting time for exerting parental authority. It is suddenly discovered that the child's hands are not clean, nor his hair brushed, and he is scolded and sent away from the table to repair these unfortunate omissions. This hardly serves to whet the child's appetite for his dinner, nor does it insure his perfect enjoyment of the meal. It had not occurred to any one ten minutes before the dinner hour to hint pleasantly to the child that clean hands and well ordered hair were passports to good society. When he returns to the table after having performed the necessary ablutions, if there is any sin of omission or commission that he has fallen into during the day it is usually brought up, and threats of dire consequences to follow serve as a sauce for the youngster's food. He is not allowed to take part in the general conversation, and he is reproved for the slightest breach of good manners. No wonder that the child hurries his meal. No wonder that he is thin, nervous and dyspeptic. He has been forced into this condition by the colossal asininity of his parents; and if his irritable condition brings about unnatural tastes, and if he steals away from parental authority at the earliest possible opportunity, they alone are to blame.

If there is one time when a truce to all strife and contention should be insisted upon it is at meal time. The dining room should be the pleasantest room in the house, and instead of the strained and formal function, which it now is in many households, the dinner hour should be the merriest, happiest hour of the day. Ample time should be allowed and all hurry should be avoided. Children especially should be unembarrassed and free to enjoy themselves. They should be encouraged to talk and joke, and the old adage of "Children should be seen and not heard" should be buried beyond any possibility of resurrection. In this way they will not only learn to love their home, but will be able to observe the chief requisite for perfect digestion and eat slowly.

Another rule which should be rigidly enforced in the nursery is to the effect that a child should never be allowed to take a drink of anything

while he has a particle of food in the mouth. This habit of washing down the food with a liquid is often a trick that has been acquired in the nursery, and may very possibly be the result of the anxiety on the part of the nurse to finish the meal and hurry to some more congenial occupation.

Nature entitles us to a fine set of teeth, just as every man is entitled to a living, but in both cases we are obliged to work hard to get what we are entitled to. Intelligence, high aims and energy will do as much in the one case as in the other, and, unless we are handicapped by some unfortunate inheritance, we can have good teeth if we want them badly enough. If we could have selected our ancestors we should probably have had an easier problem to work out, but there is scarcely an evil tendency that cannot be corrected, and there is scarcely a set of teeth that cannot be made useful, comfortable and even attractive if the work is begun early enough and sufficient care is given to the subject.

We are certainly unwilling to go back to the life of our uncivilized forefathers, even if by so doing we could obtain some of the physical blessings which they enjoyed and which we admire. What then must we do? Realizing the immense benefit which simple food and hygienic measures will bring about, mindful of the fact that mastication will polish the teeth and stimulate healthy nutrition, appreciating the fact that inherited tendencies may be overcome or their effects minimized by careful attention to the laws of health, still we know that all these things take time, and the fruition of our ambition may not be reached in a day.

Care of Children's Teeth.

Assuming, however, that we have resolved that a child shall have good teeth, we begin our care as soon as the first tooth comes through. A clean, soft, wet cloth may be used to wipe off the teeth, and if this does not seem sufficient to keep them bright and shining a little chalk may be used on the rag. If the nurse is wise and feels her way carefully so as not to arouse opposition, this cleansing may be done after every meal and will become a delight to the child, who will experience a sense of relief and refreshment on having his teeth and gums rubbed. This will also teach the child to open the mouth, and in this way will simplify the dentist's work when the time for the first visit arrives.

When the first temporary molars have been cut the brush may be used. It should be small, and the bristles should be soft, and it should be used very gently. Gradually brushes of harder bristles may be selected, but care must be used so that cleansing the teeth shall always be an agreeable occupation for the child. The child will usually evince an early desire to polish his own teeth, and he should be encouraged in this and taught how to do it. It is well to remember that most brushes are too large; therefore select the smallest. Also remember that it will do no harm to

rub over the tops or grinding surfaces of the teeth as vigorously as circumstances will permit, but that care must be used in brushing near the gum margins. The rag or brush must be kept surgically clean, otherwise it will become a breeding place for bacteria. After using it should be washed in hot water and an antiseptic, and before using again the hot water should be allowed to flow over it, after which it may be put into the cold water.

At as early an age as possible the habit of brushing the tongue should be incorporated with the care of the teeth, for the tongue forms a lodging and breeding place for bacteria, and by keeping it clean not only are the teeth protected, but the health of the child as well. Nothing is better than the ordinary tooth brush for this purpose.

The child should never by any suggestion on the part of the nurse or parent be made aware of the fact that toothache exists in the world, nor should he ever be told except by the dentist that dental operations are painful. Dread of the dentist is not inherent in a child, but if it exists it has usually been taught the child by some recitation in his presence of the woes of the nurse or mother, or by contact with other children. Until the child has come to know the dentist thoroughly it is important that he should be free from prejudice and apprehension. After that if the dentist is worthy of confidence the child will trust him, and there need be no fear of trouble from any nursery tales of the horrors of dentistry.

If time permitted I would speak of the imperative need of caring for the first teeth. I would speak of the training of the child for the eventful day of his first dental operation and the management of children in the office. I would speak of the importance of frequent examinations and frequent polishings, modifying Dr. D. D. Smith's practice to suit the necessities of our less tractable patients.

I might also speak of the eruption of the six year molars and the increase of responsibility which comes with them. I should also like to speak of the home brushing and care of the teeth, but I can only name the subjects and leave it to your own wisdom to build up such a working hypothesis as will enable you to take a child through life without his having had a serious or painful operation. This I deem true prophylaxis, and it is along these lines that the highest professional standards will be realized and the greatest good to humanity will be accomplished.

Second District Dental Society.

February Meeting.

A regular meeting of the Second District Dental Society was held on Monday evening, February 10, 1902, at the residence of Dr. J. P. Ruyl, No. 49 Ashford street, Brooklyn, N. Y. The President, Dr. Turner, occupied the chair. The Secretary read the minutes of the December and January meetings, which were approved.

The President. We have been disappointed in not having an essayist here, but we all know that when three or four dentists get together they will talk "shop," and lots of good things will come out. I think we all may spend the evening profitably if each one will have interest enough to tell something.

Dr. D. W. Barker Hot Water Device. I brought this little apparatus, thinking it might interest some of you. It is making my daily work easier and lighter. It is simply a little heating device for keeping a glass of water warm, for syringing. It is so simple that I do not think any explanation is necessary. You may inspect it (Fig. 1). It keeps a glass of water at any temperature you desire. I find about 110 degrees is about the right temperature at this time of the year. It stays right by me all day long. You all know that if you bring a glass of water into the room, in a few moments it is too cold; or if not, you may start with it too warm. A very minute blaze under it will keep it just right.

Dr. Hillyer. Archite. I realize that probably most of you are interested by this time in the subject of archite, and when the notice came to me that the essayist would not be here, I thought a discussion on it might be in order. To that end I tried to make in a few days something on the order of the experiments intimated by the archite pamphlet. I do not

know that these experiments really signify very much after all; but what I have done will perhaps be a saving of labor to those interested in it; so perhaps the work has not been thrown away. I have not spent a great deal of time on it, merely working from time to time preparing these tubes, looking at them and changing them.

The preparation of archite I presume you are all familiar with. It is prepared in the same manner as cement, but the manufacturers claim it is not cement. It seems almost like stone. Put into a cavity, it seems to be so hard you cannot scratch it, if put in properly. The only thing we can judge it by finally will be time. They say they have put it through all the tests possible, and it has withstood all. It seems on the face of it to be liable to do that. The tests that I have given it have been comparatively simple. I took ammonia in its strongest form, and took a cement which I will not name —the one which I consider the best—perhaps we all differ as to which is the best. The one I took has been in the ammonia solution with one change, and that change was made on Saturday after four days. As you see, considerable disintegration has taken place. This other one is archite, and there is no change apparently. I have not scratched the surface of it, but it rattles around in the tube, and seems hard. That is the ammonia test, the alkaline, for the cement and archite.

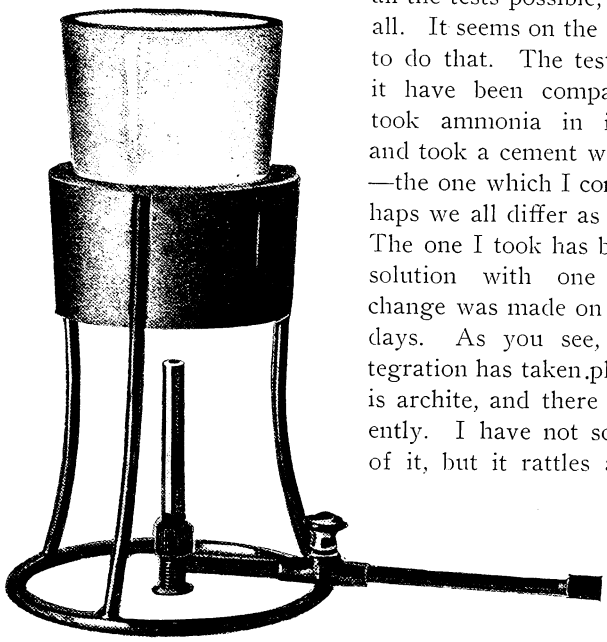


Fig. 1.—Dr. Baker's Water Heater.

The lactic acid test seems to have no effect at all. I have it 50 per cent. and also down to 10 per cent., because oftentimes when an acid is weaker it has a greater effect. Sulphuric acid would act more quickly at a low percentage than at a high one. Lactic acid does not seem to affect either the cement or the archite. That is the archite in the lactic acid. It is so oily it does not give you the same effect. Here are the 50 per cent. and the 10 per cent. The one restored on the corner is the cement, and the filling in the crown in full is the archite. I have had

these specimens out, and there seems to be no change as far as I can see.

Dr. Gould. Have you applied force to see whether there is any change? Are they more brittle?

Dr. Hillyer. Yes; there is no change. In the 50 per cent. citric acid there seems to be no change whatever in the archite. I have had that out, and at this stage it shows no perceptible change in its character. Here is a specimen of a tooth where I prepared a cavity on the side and one in the crown. One I filled with archite, and the other with cement, and with a 25 per cent. solution of citric acid, inside of six hours, the cement was half washed out, and inside of twenty-four hours it was entirely washed out; whereas the archite has not been affected at all. That shows the effect of the 25 per cent. citric acid. I intended to make another specimen, cutting two cavities in the same tooth, and using the 10 per cent. solution. These have not been coated with paraffine at all. I purposely left it off, so the acid would attack it if it could. I put them in immediately, as soon as they were well hardened. One test I left out, which did not occur to me—a very simple one—and that is the test in water alone. It did not seem as if that would have any effect on it, but perhaps it has.

I have taken these specimens as soon as they hardened, and one of these I placed inside of an apple section and the other two in parts of an orange and have left them two days, and I have found no effect on either the cement or the archite, so it simply remains to be seen which will withstand the longest. If archite will do all they claim for it, it seems as though it would be something we have been looking for for a long time.

One thing that has impressed itself upon me in the use of it is the fact that in those sensitive cavities, especially at the gingival margins, where, when we are forced to use cement, oftentimes there is a cringing by the patient, a sensitiveness of the tooth; it does not seem to be so with the archite. Perhaps it is hard to get it just right as to the consistency, but that will come with practice. It sets rather quickly, but perhaps we may be able to overcome that. It is advised to mix it quite thick. I have tried to do that as far as I could. I am simply waiting now to see what the result of those cases will be. There are some patients that I have in mind now, for whom it is utterly impossible to put in anything else than cement fillings, and if this kind of filling can be placed in, it will save a great deal of work and also strain on those patients. It remains to be seen what it will do. It is going to be quite a revelation, I think.

Dr. F. C. Walker. Does it stick to the instruments?

Dr. Hillyer. Not at all. There are instruments—spatulas, I understand—that are made to use with it. I tried to get them, but did not succeed. I understand they are made of birch. Operating with a steel instrument will discolor it slightly, but I think that can be readily overcome. We can make our own spatulas if we need them; but it does not stick, if you mix it thick.

Dr. Ash. I have found difficulty in having the cement stick to the instrument, and have overcome that by slightly moistening the plugger with the liquid on a piece of cloth. It needs only the slightest dampening to do away with the sticking to the instrument.

Dr. Gould. I had exactly the opposite experience. I have not had trouble with the instruments sticking, but with the cement. I found that when I mixed it as I do Ash's cement, I could not get it in the cavity, and I was satisfied in one case that there was about as much air in the cavity as archite; I drilled into it and found I was right. You do not get a good union between the tooth and the archite. There should be a good tight joint. I have also noticed that where there has been sensitiveness when cement was placed in the cavity, the archite gives no pain at all.

Dr. D. W. Barker. The mixing of cement is something that is apt to be done carelessly. If half a dozen of us would attempt to mix cement—each take a slab and some cement—no two would do it alike. Last spring, when I was at Swarthmore, on a visit to Dr. Flagg, he mixed some for me, and it was a revelation to me how he put it together. I have tried it many times, and I cannot do it today. He taught me a great deal about the proper mixing of the powder into the liquid. The same thing applies to the archite, and any other quick setting cement. If we take a portion of the liquid on a slab and then incorporate a small portion of this powder, that portion will become wet, and many of us will immediately add some more powder. That is not right. That first portion of powder should be stirred into all the liquid until the whole of the liquid has some of the powder in it and it is a homogeneous mass; then another portion of the powder is added, and that stirred until the whole mass is homogeneous. It takes quite a little stirring, adding a portion of the powder each time, seeing that it is mixed throughout the entire lot of the liquid. There is a little knack in it. You will not be able to do it the first time probably. It should be carried quickly to the mouth. The heat of the mouth or the tooth causes it to crystallize quickly. By the time you turn around and get another instrument it sets.

March Meeting.

Discussion of Dr. Kirk's Paper.

The President. It is not difficult to follow a long beaten path that has been trodden by some one else; but this is original work, and we are very grateful to Dr. Kirk for his exhibition tonight. We shall be pleased to hear from Mr. Gayne.

Mr. Gayne. I thank you for the honor of being with you. I always like to listen to anything that comes from Dr. Kirk. His papers are always so complete that there is practically nothing left for any one else to say. I have been very much entertained and instructed by listening to the ingenious method Dr. Kirk has described for isolating these various salts in the saliva. Any one who has had experience in this direction knows how difficult it is to get the results shown here to-night, and how difficult it is to get salts which have the same crystalline character to always crystallize in the same manner, to make them appear similar to one who is not familiar with them.

I do not believe I have seen more beautiful specimens than the lacto-phosphates which Dr. Kirk has shown tonight. I would like to say that Dr. Kirk has taken up the right line of investigation—of course, I speak from the chemical point entirely—in studying the conditions prevailing in the mouth from a chemical standpoint, rather than attributing it to what is put down generally as constitutional effects. It is extremely interesting to a chemist to know that all these conditions in the mouth can be explained purely on chemical lines, apart from the constitutional effects, although, of course, those do play a considerable part in the formation of those products. Take so simple an occurrence as the presence of uric acid in the mouth. It is due to the decomposition from the blood current, but looking at it from the chemical standpoint it is easy to see how such a substance could be formed in the mouth apart from the consideration of the blood. We have the presence of cyanides, forming cyanide of potassium and sodium in an active condition in the mouth. When those cyanides get with uric acid, it is a very easy step from cyanides, to cyan-uric acid, to urea and uric acid. I know the chemical viewpoint that those pathogenic conditions in the mouth is the most difficult to explain; but you must recollect that in the study of the dead languages in the early days it was decided that the more difficult reading was to be preferred, and I think in this matter it should equally apply. We must not forget the remark of the famous Sherlock Holmes that when you have a theory that fits all the facts, no matter how improbable the theory is, that theory

must be the correct one, and therefore I think Dr. Kirk's theory must be the correct one.

Dr. Bogue, New York. I have nothing to offer on Dr. Kirk's paper, excepting my thanks and an expression of pleasure that he has taken up the obscure questions that Dr. Michaels tackled some years ago, and has taken a step forward. The exhibitions he has made on the screen are so wonderfully beautiful that I have enjoyed them greatly. As he says, they do not quite equal the exhibitions made under the microscope with the polariscope on the table. He failed to say one thing that I wish he had said, for the very stupid ones among us—myself among the number—that all these crystals that are seen maintain their characteristics right through. They can no more be mistaken, once they are learned, than the letters of the alphabet. What he has succeeded in accomplishing and what he has given to us tonight should encourage all of us to go forward in the study of the saliva which has only just begun.

Dr. Head, Philadelphia. It is with a great feeling of what I may truly call emotion that I speak on this subject tonight. It is not that I think I am competent to deal with it as it deserves, but I have a personal feeling about it. It has been my pleasure to see the various steps that Dr. Kirk has at times taken in this work. I have been at his house, and as early as last fall he showed me specimens of the saliva that had been examined before the ptyalizing process had been used. He felt, as I and others felt, that while he was on the proper road, to a certain extent he was still in the dark, and that no definite results had been obtained; but the steps he has taken since he devised the scheme for ptyalizing and concentrating these salts free from the protein effect of the ptyalin substance, and the mucein, put an entirely different aspect on it. The use of the polariscope and the ptyalizer in the examination of the saliva is one of the most important scientific steps that has been taken in the study not only of saliva, but it will also prove to be so in the study of tooth substance. While Michaels pointed the road, and to some extent did give us certain data, I think the data which Dr. Kirk has added is of incalculable value. In fact, the very vagaries and the difficulties and the number of the forms will, when properly classified, prove a source of greater value, because it will be a means of finer differentiation and more accurate diagnosis. I think we can, to a certain extent, compare the work that Dr. Kirk has shown tonight with the discovery of the Rosetta stone. Up to that time the Egyptian hieroglyphics seemed impossible to decipher; but by means of that stone the alphabet was learned, and the first crude parts of speech and construction of the language were obtained; and so I feel that the

first alphabet in the study of saliva and in the study of tooth substance has been really laid before us tonight, and no doubt with the alphabet and the directions given to us so clearly, as they have been, the page that lies before us will be deciphered, and the science of the saliva and the intricate and the inner substances of the tooth will in time be laid bare.

Dr. F. D. Weisse, New York.

I did not expect to be called upon tonight to make any remarks. I am impelled to say that I have been more than delighted at listening to the paper or explanation of the demonstration that we have had from Dr. Kirk. I had the pleasure within a few months of visiting him at his house, and he certainly opened my eyes to the possibilities that lay in the careful investigation of saliva. This demonstration tonight is a happy sequence to my pleasant experience at his home, with reference to his work upon saliva. He has left nothing to be desired as far as he has gone, and I heartily concur in the remarks of Dr. Head that the Rosetta stone of the investigation of saliva has been laid before us tonight—the means or ways by which saliva can be examined to a practical end. The solution of the etiology of this particular case leaves nothing to be desired, and leaves it perfectly clear as to the cause of the pathological condition of the patient's mouth. While the investigations of the saliva may indicate, as the gentleman speaking from the chemical standpoint stated, that all possibilities are in the buccal cavities, we must not lose sight of the probable effects of constitutional conditions. Constitutional conditions must necessarily determine the possibility for these changes taking place in the buccal cavity. If the constitutional conditions were all correct, there would be normal conditions in the buccal cavity. If proper conditions of oxydation existed, the changes would not occur by which we would have stages of sub-oxydation, accumulations of uric acid, or the possibility of the formation of uric acid, and in all probability the formation of conditions such as obtain in this particular case.

So that while we are to regard the investigations at the buccal cavity for local effects upon teeth, we must also bear in mind that those conditions or possibilities in the buccal cavity are due to conditions behind that which are constitutional in character, and as systemic or constitutional makes it possible for these changes to occur in the buccal cavity. Under those circumstances, if we go behind the phenomena resulting from the existing conditions, we have some starting point for an intelligent treatment of the case, to alter the general condition of the system by a suitable line of medication which will lead to an alteration of the constitutional condition, and assist in making it possible for the peculiar phenomena to develop in the buccal cavity or in the urine, or in the blood, determining modifications of functions such as in this case, where the

patient suffered not only from the condition of erosion of the teeth, but also from repeated attacks of rheumatism and from modification of digestive function and also from conditions of neuralgia, all these dependent upon a systematic condition, the phenomena in the mouth presenting as a phase of the general systemic condition.

But we must hail with great satisfaction this result in the investigation of saliva. I was remarkably pleased with Dr. Kirk's demonstration when I visited him, and I took occasion to follow out what he did—a trick, I call it, that he practiced upon Dr. Michaels in Paris. He told me on the occasion of his visit that he had a friend who was traveling in Europe with him, who was much interested in a case that had rather balked the medical treatment of those on this side of the Atlantic, and he sent a long distance for a specimen of saliva of that patient and brought it to Dr. Michaels, handing it to him as an anonymous case, without any history. Dr. Michaels said to him on that occasion, "Ha! ha! I see you are going to test me." "Yes, I am," said the Doctor. Dr. Michaels made an examination, and after a few days reported to Dr. Kirk, and Dr. Kirk expressed himself to me that he was delighted and surprised to a degree at the correctness of Dr. Michaels's diagnosis from the saliva.

On my return to New York, I sent a specimen of saliva to Dr. Kirk. I did not give him any history, but it was a typical case of its kind, and after a few days I received an answer from him, giving a clear statement of the condition of the patient and a probable diagnosis of the case. From his examination of the saliva he gave an excellent history of the condition of the patient from whom I obtained the saliva. It was correct. His surmises were two in number—that the patient was suffering either from diabetes or carcinoma in some part of the body; but he had not the means of determining as to diabetes, as he could not examine specimens of the urine, as he should have had opportunity to do.

I would state that he came so close to it that the patient is suffering from an epithelioma of the uterus, and a diagnosis was clearly made out by Dr. Kirk. (Applause.)

That was a pleasurable letter to me, as it indicated what the possibilities are in this new field of examination with the saliva. And why not? It is eliminated from the blood. We examine the urine, and examine the blood itself today; we have examined the urine for a long time; but the saliva is a new trail, and hail that Dr. Kirk is on the trail!

Dr. M. L. Rhein, New York.

No member of our profession present this evening can fail to be imbued with the sentiments uttered by the last speaker. I had the pleasure, a few months ago, of indicating to the members of the New York Odontological Society what they might expect from the work of Professor Kirk.

The last speaker has struck the practical keynote of this question as applied to us as dentists, and not only dentists, but to the entire medical world. In a paper which I had the pleasure of presenting a few weeks ago before a medical society, in which I introduced the subject of the value of oral pathology to general medicine, I made the statement that there was in store for the medical profession a means of aiding clinical diagnosis that would in time outrival what we were able to gain at the present day either from examinations of the urine or the blood. I told them at that meeting of the work, and I took great pride in saying that the work was started by an American dentist in Paris, Dr. Michaels, and was to be followed up in this country at dental educational institutions, and that it would eventually bring great results to the medical profession at large. It is a great pleasure to me this evening to feel that Professor Kirk has made such enormous strides towards realizing my prophecy.

Without going at any length into the subject, I want to say a word in reference to the remarks of Mr. Gayne, and I say them with a little apology to Professor Kirk for fear of anticipating what he might ask Mr. Gayne himself. Mr. Gayne made the remark that the uric acid, the urates, the quadurates, all the forms, I suppose, could be accounted for in the mouth from local conditions there present. That is not the pertinent question that interests us as dentists. I say this for the enlightenment of Mr. Gayne. I would like to have him tell us in what manner he would show the formation of uric acid or urates on the roots of teeth, where they are entirely removed from the action of the oral secretions in any form, and I would like to find out by what chemical metamorphosis he is going to show us the possibility of a local etiology of any of those formations through the local secretions that flow into the oral cavity. I bring this point up for fear Professor Kirk may not have had his attention brought to it, which I doubt, because I believe Mr. Gayne does not clearly grasp the phase in which the sub-oxydation strikes the pericemental tissues. There are other phases outside of the erosion phase which are far more important in the preservation of the dental organs. When the pericemental tissues are affected without any direct connection with the oral secretion, then the stability and the life of the tooth itself is imperilled. I merely bring this question up because if there is any value at all in Mr. Gayne's remarks, I would like to see him demonstrate them from that point of view.

One remaining point to which I would like to call the attention of the guest of the evening is in describing the case in question I was very much impressed by the similarity from a clinical standpoint to the forms

and conditions of tooth structure that we get in infantile scorbutus, and I would like to call the essayist's attention to the possibility of a similarity of chemical conditions in the results that would be here obtained, in order, if possible, to elucidate what is undoubtedly in the dark at the present time; where or how this fermentative process which must be at the bottom of it to cause a lactic acid condition, is inaugurated; how it does its work, and in what way it is present in the mouth when there is no actual fermentation that appears to the naked eye.

I believe there is no possibility of any other interpretation than that of a constitutional one on all these phases of oral pathology, where there is a distinct and sudden deterioration from the normal physiological conditions. I trust that the President will ask Mr. Gayne to reply to the point that I have raised.

Mr. Gayne. I do not know that there is anything special for me to reply to in that point. My knowledge of medicine, physiology and anatomy is limited. My idea was not to furnish an explanation of the presence of these secretions at the roots of teeth. That is work which Dr. Rhein himself will do—that is work for the dentist, not for the chemist. My remarks were directed to pointing out the fact that there was a possibility—that there were all the conditions favorable for that production—without taking into consideration the constitutional relation, although I think I said the constitutional condition might play a large part in it.

Dr. Rhein. How do you explain these conditions? This is not a dental point. You can bring it to the chemical laboratory. You have the root of the tooth, which is separated from the oral fluids. They cannot reach it, yet we find these deposits on the roots and the tissues surrounding these roots without any communication with the oral cavity. I put it to you as a pure chemical problem, asking you either to prove it or to withdraw the proposition you made.

Mr. Gayne. I do not think I made any statement with reference to the formation of deposits at the roots. I am speaking simply with reference to the deposits in the mouth, where you have free access to air, light, moisture, and all the salts, ferments, acids, etc. The other is a condition entirely outside of the sphere of the chemist. I think that is for the physiologist to decide.

Dr. Birchmore, Brooklyn. Gentlemen, I am a guest here tonight, and I appreciate your kindness in letting me speak to you, for the sake principally of getting an explanation for myself of some things which I do not quite understand. I am not a dentist; I speak to you simply as a bacteriologist, and

I need perhaps make no further explanation. Granted the fact, which is known to all of us, that lactic acid is present in the mouth in a great number of cases, it requires for its presence, so far as we know, two things—sugar and a ferment. The sugar we can account for perhaps, and also the ferment; but can we explain this: It has been assumed two or three times this evening, by speakers, that Dr. Kirk intended to imply that in some form or other, lactic acid pre-existed outside of that mouth. I have had occasion to make some studies in regard to the attacks of lactic acids on a great variety of lime salts during the past two years, and I have been surprised to find that it will attack the supply of the glue factory, the bones, just as quickly as it does anything else in that line, and I fail to see how if a lactic acid salt is in the circulation it should select the teeth rather than any other lime substance to attack. In fact, it should attack bones before it attacks teeth. Granting that as a general truth, there is one other thing to be remembered. Lactic acid is a fermentative product first, last and all the time, and it is specifically the product, as far as we know, of possibly three distinct elements. Two of those are present in my own mouth nine-tenths of the time. Hardly a day passes that I could not start a culture in which would grow to a considerable extent that particular element which would produce lactic acid. A physician in Brooklyn had a diabetic patient, whose mouth was so acid that it was a matter of comment to him and to others. I obtained some of that saliva and found an enormous quantity of the vibrio-lactique, as it has been called. I found I was able to identify at sight, without the necessity of previous culture, this same condition. I see three conditions which might have brought about the condition Dr. Kirk has given us; first of all, given a mouth to which this bacteriological growth has been introduced and the habit of eating much sugar. If the habit of candy eating belonged to a person and the vibrio-lactique was in his mouth, the mere presence of the sugar would give the conditions required by that substance. Equally so, if the person were to a small degree a diabetic. I have been told by several physicians that a temporary diabetes during sleep is not rare, and under such conditions all the secretions of the body will contain sugar which is fermentable. The habit of candy eating would produce the condition mentioned, provided that the vibrio-lactique were present.

Dr. Wm. Jarvie, Brooklyn.

I think it is an extremely fortunate thing for us as a dental profession, and perhaps for the world at large, that Dr. Kirk was moved to go to Europe last summer, and so be brought in contact with Dr. Michaels and be infused with his enthusiasm to follow the experiments in this line. It does seem very probable that the saliva may be found

a medium through which diseases can be diagnosed better than any other. Undoubtedly in the experiments that Dr. Kirk has been conducting since last summer this question of erosion is simply an introduction to many lines in which these experiments will lead him.

The question of erosion is perhaps one that, as dentists, interests us especially at this moment. It is a disease or manifestation which has always interested me since I have known anything of it, and I have followed, as well as I could in the discussions in the journals, the views of the most eminent men in the profession, both in Europe and here, and the experiments that have been made at different times to show the cause of the erosion and to get out of the mouth the same condition we get in the mouth, namely: the action of an acid without the ordinary corrosive effect, leaving a polished surface such as we get in erosion. As late, I think, as 1872, as close an observer as Mr. Charles Tomes held that what we call erosion was simply the effect of mechanical abrasion and was not a chemical solution or wasting away. Other men up to that time held that same opinion, and that apparently in the face of many cases that all of us have seen, where conditions were such that it seemed impossible that the abrasion could have brought it about, particularly where the erosion was parallel with the long axis of the tooth. In 1873 Dr. Chas. E. R. Koch presented before the Illinois Dental Society a series of experiments covering several months, in which he endeavored to obtain out of the mouth the same conditions we find in the mouth; but he could not do it. He could get nothing but a corroded or roughened surface of the teeth by acid, and by no means could he produce the polished surface; yet he claimed, as others claim with him, that the erosion was the effect of an acid upon the surface of the teeth, and this acid excreted from the mucus glands.

Later, in a series of experiments, Dr. Black succeeded in producing this polished surface out of the mouth by the action of acid, and that was brought about by the constant movement of the liquid in which the tooth was immersed. I think the movement had to be at the rate of about thirty feet a minute, or something of that kind, to produce the polished surface.

We have a series of experiments beautifully presented to us tonight—I think they are the most beautiful I have ever seen on the screen—by which Dr. Kirk goes very much farther and tells us not only that this erosion is the effect of an acid, but tells us just what acid it is. As I understood him, the fermentation producing the lactic acid took place in the mouth. I may have misunderstood him. I did not understand that the lactic acid was caused by any constitutional condition, but that it was a local result. While that may account for a certain class of cases

of erosion, it does not account for another class. Dr. Kirk spoke of a patient whom he expected to bring, where the erosion was on all the surfaces—on the labial, palatal, mesial and distal; and not knowing what course this discussion would take, or what was to be presented, I brought a number of models with me. I think I have one series that would illustrate a case similar to the one Dr. Kirk mentions. The models cover a period of about seven or eight years. The six anterior teeth gradually wasted away on all four of the surfaces. I would like to pass these models to Dr. Kirk and have him say whether that is such a case. I think the dates are on the models.

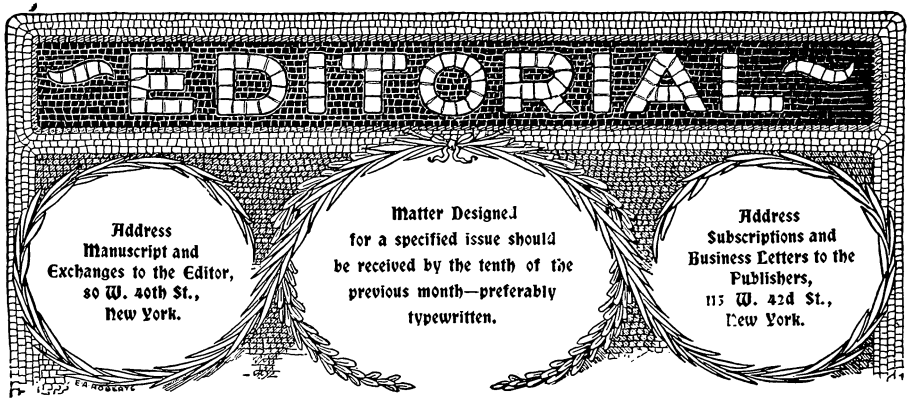
Dr. Kirk. It is very much the same.

Dr. Jarvie. The lady died shortly after the models were taken. Dr. Kirk has certainly introduced another chapter in the history of the cause of this disease, and if we once really know the cause, I think the treatment will very readily follow.

Dr. Kirk. I want to express my thanks for the very full discussion which has been brought out. I would also express my thanks for the many kind things which have been said, if I could do justice to that subject; but I cannot say more than that I appreciate very much the complimentary expressions which have been offered on the results here shown. I evidently have failed to express my position with reference to the formation of lactic acid in the mouth; I presumed every one here was quite familiar with the mode of formation of lactic acid in the mouth, and also with the fact that we do not have lactic acid circulating in the blood stream. What I endeavored to bring out was that these crystal formations found in the oral fluid represent a purely local condition so far as this case was concerned. The constitutional factor, if I may express it in terms which would make it clear to the bacteriologist, is the factor which so alters the oral fluids as a culture medium that they have a selective quality for certain forms of bacteria. As to the mode of production of lactic acid in the mouth, I presume every one is familiar with the teachings of Dr. Miller as to how carbohydrates, such as starch and sugar, through the vibrio-lactique for example, are converted into lactic acid. What I want to further speak about is this: that the local production of these salts, which may be found by a microscopical examination, is an important finding, because we now know they are produced locally, and are not necessarily, as Michael holds, circulating in the blood vessels, and pass out through the parotids or salivary glands. This does not invalidate the general position of Dr. Michaels. His general theory is that these conditions are typical of certain systemic conditions, which I am convinced holds true.

With regard to the localized cases of erosion, I ask you to draw a distinction between the case reported and those where we have those peculiar graphic erosions or etchings on the teeth, I think that is a different condition. It may have the same constitutional background, but the mode of expression in the mouth is different. I think that it is due to the action of certain acid salts, which I believe to be the sodium acid phosphate and the calcium acid phosphate. I have reason to believe that. I have not gone far enough to take it to the point of a demonstration, but if any of you want to produce an etching of the surface of a tooth which will have that polished surface, and which will not require a current of acid running at the rate of thirty feet per minute, or whatever it may be, you can produce it. All you need to do is protect your tooth over the main portion with a coating of balsam, or something impervious, leave an exposed area, and drop the tooth into the acid sodium phosphate. It will etch the surface, leaving that peculiar glassy or lustrous surface that in mineralogy we call a resinous lustre. If the solvent action were supplemented by the slightest friction, we would have the surfaces kept clean and polished. There is not the least shade of a doubt in my mind that the graphic form of erosion is due to the acid sodium phosphate. The systemic condition which makes the development of acid bacilli in the mouth possible, has been classified as a disease sub-oxydation. I do not want to have any mistake about the position of this work in regard to the work of Michaels. It is purely supplemental, and it is one attempt to answer the question "What are these abnormal compounds in the saliva, and what do they mean?" He has already said that is for the chemist to answer. I am stating it from the position of the chemist as well as pathologist.

The research has progressed much farther than appears here tonight; but it is not fit to bring before you as a completed demonstration. At some future time I hope to be able to report a farther step.



Ill Advised Interference by the Faculties Association.

At the last meeting of the New York State Dental Association a letter addressed to that body, signed by officers of the National Association of Dental Faculties, was read and produced anything but a pleasant impression.

By a recent act of the State Legislature, the dental law of New York was amended, authorizing the Board of Regents to exchange the diplomas which conferred the degree of Master of Dental Surgery, for others authorizing the title Doctor of Dental Surgery. The language of the act was not mandatory, and certain members of the State Society opposed the contemplated exchange of degrees, in consequence of which a protest was lodged with the Board of Regents, claiming that the law had been passed without proper discussion before the State Society and urging the Regents not to act until after a meeting of the Society at which an expression of opinion might be officially voted. This protest, coming from members of the State Society, at least had the authorization of parties in interest.

The Regents, in answer to this communication, expressed a willingness to make no exchanges until after the meeting of the State Society, and it was well and widely known that the subject would come up for discussion. The members however were not a little surprised to hear read the following letter from the Faculties Association:

Letter from N. A. D. F.

"*Whereas,* The New York Legislature in a bill signed March 28, 1901, gave to the Board of Regents authority to exchange the M.D.S. degree for the D.D.S.; the former (M.D.S.) is strictly a local degree conferred by the Dental Society of this State, and

"*Whereas,* The said Board of Regents at its annual meeting, July 1, 1901, declined to exercise the power conferred and referred the subject to the New York State Dental Society for a more definite report on the matter. Therefore be it,

"*Resolved,* That the thanks of the National Association of Dental Faculties be tendered the Board of Regents of the State of New York for its action in postponing a final decision, thus giving opportunity for protests against the proposed action.

"*Resolved,* That the National Association of Dental Faculties respectfully protest against any attempt to undo the work of this Association, which for many years has had in force a law which does not permit the granting of the degree of Doctor of Dental Surgery (D.D.S.) except at the close of a course of study in some accredited school and on proper examination.

"*Resolved,* That we further earnestly and respectfully ask that the authority thus given the Regents be rescinded.

"*Resolved,* That a copy of these resolutions signed by the President and Secretary, be sent to the Regents office, Albany, New York, and also to the Secretary of the New York State Dental Society, W. A. White, Phelps, N. Y.

(Signed) B. HOLLY SMITH, President.
J. H. KENNERLY, Secretary."

It would be interesting to know just when and at whose instigation the above was formulated and authorized by the Faculties Association. Was it passed before a full meeting of that body at its last annual session? Or was it authorized merely by a committee? At whose initiative was the subject brought before the Association or committee?

By whatever means, and by whomsoever, the Faculties Association has been placed in the position of receiving a well merited snub for its attempted unwarrantable interference in the legal affairs of a state, and a State Dental Society. It is not so very long since the more hysterical

members of the Faculties Association, were crying out that the National Association of Dental Examiners had no legal national existence and consequently no jurisdiction over dental college matters. What a retrogression from that position is the above attempt to interfere in the existing legal laws of a state!

The Faculties Association, or such of its members who may have no cognizance of this letter, will not be over pleased at the answer sent by the State Society of New York. That body instructed its Secretary to simply notify the Faculties Association that by a vote of sixty-one to twenty, the State Society passed a resolution requesting the Regents to act in accordance with the law, and grant the D.D.S. to such as might apply for the exchange.

M.D.S. versus D.D.S.

It will be instructive perhaps at this time to review briefly the action of the State Society in conferring the degree of M.D.S., and to analyze the statements in the Faculties Association letter.

In some quarters it has been sought to create the impression, and by some it has been supposed, that the M.D.S. was merely a certificate from a Board of Examiners. Such was not the case. It was a degree in dentistry, legally conferred by a body duly qualified by law to examine candidates and grant the degree. It in no sense differed from a college degree, except that the body granting it did not likewise furnish the education needed to qualify for it. In plainer terms, the college is chartered by the state and its charter authorizes it to educate, examine and grant a degree in dentistry. Usually this is the D.D.S., though we have the D.M.D. of Harvard, and for a time another degree was granted by a New York school. The New York State Dental Society is likewise a chartered institution and by act of legislature it was authorized to examine candidates and confer the degree Master of Dental Surgery.

When this new power of the State Society was under discussion, the revered Dr. William H. Atkinson said: "Be sure you understand what you are doing. There can be no degree higher than Master. See to it well, that it is bestowed only upon those who are worthy and well qualified."

How has this injunction of the great mentor been observed? To the credit of the State Society, and its Board of Censors, it may be said,

"right nobly!" Since its initiation about 340 men have taken the examination as candidates for the degree. Of this number only 160 passed and received the coveted M.D.S. These figures scarcely indicate that the title was easily earned, especially when it is mentioned that a large proportion of those who failed, as well as those who passed, already had the D.D.S., while many came up fresh from their college examinations.

Another way of learning the nature of the standards erected by the Censors as pre-requisite to the obtaining of the degree, is to scan the records of those to whom it has been awarded. Three facts stand out conspicuously. First: The large majority of the M.D.S. have contributed to the progress of the profession, earning the esteem of their fellows at home, and envied reputations beyond their own state, yea even in foreign lands. Second: Nearly all have kept up affiliation with dental societies. Third: No M.D.S. has ever been known to be associated with any advertising or unethical dental office, all adhering to the ethical oath taken when their diplomas were received.

And these are the men against whom the Faculties Association ventures to enter a protest. In doing so they fail utterly to realize that any man having the M.D.S., who willingly exchanges his title for that of D.D.S. makes a sacrifice. He gives something which links him to an honored body, in exchange for that which has been too often discredited and disgraced. Those who already have the college degree would really get nothing whatever in return. The only possible purpose in the exchange would be to aid the movement towards having a single title, D.D.S. stand for dentistry, just as M.D. is universally used in medicine.

Perhaps the chief cause for shame in the letter under discussion, lies in the fourth paragraph, where it is admitted that the National Association of Dental Faculties of America has a rule forbidding the granting of honorary degrees. What other educational system has found it necessary to erect such a barrier? Are not honorary degrees conferred annually by the great Universities throughout the world? Are we not all proud of the honorary titles earned by our Dr. Miller in Germany? Why then is it prohibited in the American dental schools? Can it be that our schools are not to be trusted to confer honorary degrees righteously?

D. Orville E. Hill.

Dr. Orville E. Hill, one of the most prominent members of the Second District Dental Society, died at his residence, 160 Clinton Street, Brooklyn, June 2, 1902. He was a bachelor and leaves two sisters and two nieces. The funeral services were held at his residence, the Rev. Dr. J. Douglas Adam officiating. A large assemblage of the members of his society as well as others of New York and vicinity were present to honor his memory.

Dr. Hill was born in the Western part of New York, October, 1832. He practiced dentistry in Brooklyn for forty years, having his office for twenty-nine years in the house in which he died. The interment occurred at Olean, N. Y. Dr. Hill was exceedingly prominent in his profession and for many years had been looked up to by the younger men for advice and leadership. It is doubtful if any law relative to the practice of dentistry in New York State could be found which does not largely contain the stamp and impress of his mind. Ethics was his special study, it being his supreme desire to inspire the dental profession with the necessity of fraternal honor and honesty. He was an exceedingly lovable man, and in debate or when speaking after dinner, his remarks were often imbued with a dry wit and humor, entirely devoid of personal sarcasm. At the same time he was almost immovable from any course which he had marked out as best for his Society or for the profession at large. Having once decided that a definite course was right, no argument would swerve him and as a rule he would win the majority to vote with him. Generous to a fault with his own money, he was nevertheless ever watchful lest extravagance should deplete the treasury of the Second District Society and it is largely due to this influence that the Society has ever been in comfortable circumstances and in the position to hold important dental meetings.

Prior to 1862 there had been practically no friendly or professional intercourse between the dentists in Brooklyn. In that year Dr. Hill invited nearly every dentist in Brooklyn to meet at his office for the purpose of forming a society, whose object should be the promotion of fraternal

intercourse. An organization was formed under the name of the Brooklyn Dental Association and included in its membership dentists of Brooklyn and New York City. This was practically the beginning of dental societies in what is now known as Greater New York. In 1868, a law was passed, creating local dental societies in each judicial district and Dr. Hill assumed the leadership in organizing the Second District Dental Society. At the first meeting he was elected a delegate of the state society, which was organized in Albany in June of that year and he was there appointed chairman of the business committee. From then to the day of his death he had been active in all the leading local dental societies and at various times president of each of them. He was a member of the Brooklyn Dental Association, the Second District Dental Society, the New York Odontological Society and the New York State Dental Society, of which he was president in 1881-2.

Dr. Hill was a man of strong social characteristics and had been a member of Mistletoe Lodge No. 647, F. and A. M., for more than twenty-five years. He had been president of the Centennial Club and a member of the Crescent Athletic and the Constitution Club and of the Amaranth Dramatic Society. He was a connoisseur in rugs and his home was a museum for the display of rare and beautiful specimens. Rug portieres, rug curtains and rugs piled up in careless profusion. His furnishings and decoration of his rooms represented the work of careful collection of thirty years. Sometimes he waited years to secure a single specimen. His collection has been used in illustrations and his advice and experience sought by writers of works on the art of rug-making. The Doctor likewise had a fine collection of Chinese and Japanese pottery, especially of unique specimens, some of them of great antiquity, including Royal Yellow Satsuma, Tokio, Cloisonne, Faience and other wares. He also had a very complete collection of silver souvenir spoons from all over Europe and the United States. He was also a collector of choice paintings.

Death of Dr. Edwin Ebi.

After a brief illness of pneumonia Dr. Edward Ebi, the veteran dentist of Cedar Rapids, Iowa, passed away at St. Luke's Hospital, May 11, 1902.

Dr. Ebi was born at Canton, Ohio, March 7, 1837. He practiced dentistry thirty-seven years in Cedar Rapids. He is survived by a brother and sister.

Brief funeral services were conducted by Dr. Burkhalter of the First Presbyterian Church, of which the deceased was a member. The remains were taken to Canton, Ohio, for interment.

The Cedar Rapids Dental Society passed the following resolutions on the death of its honored member and ex-president, Dr. Edward Ebi:

Whereas, In the death of our friend and fellow practitioner, Dr. Ebi, this society has sustained the loss of a beloved member, who, by his dignity and counsels added much to the profit and interest of its meeting, and who as its honored president for two terms did all in his power to promote the welfare and high professional standing of its members, and

Whereas, We each feel the loss of a true personal friend whose kindly smiles and deep experience did much to cheer and encourage, and

Whereas, We believe that the welfare of humanity through his professional attainments was ever his aim and ideal, and whose every act was never to bring discredit upon his profession; therefore be it

Resolved, That we pay such tribute to his memory as possible. That our sympathy be extended to the relatives and friends who have also suffered loss; and further

Resolved, That a copy of these resolutions be sent to his brother, Monroe Ebi, at Davenport, and sister, Mrs. W. H. Shidler, Osceola, Ind., and also to Dr. A. J. Dowds of Canton, Ohio; that they be given to the local papers and professional journals for publication, and that they be placed upon the records of this society.

(Signed) L. E. RICHARDSON,
C. B. WHELPLEY,
GUSTAVUS NORTH,
Committee.

National Society Meetings.

National Dental Association, Niagara Falls, N. Y., July 28, 29, 30.

National Association of Dental Examiners, Niagara Falls, N. Y., July 25.

National Association of Dental Faculties, Niagara Falls, N. Y., July 31.

American Society of Orthodontists, Philadelphia, Pa., Oct. 8, 9, 10.

Canadian Dental Association, Montreal, Sept. 16, 17, 18.

State Society Meetings.

Delaware State Dental Society, Wilmington, July 2.

District of Columbia Dental Society, Washington, Dec. 16.

Maine Dental Society, Camden, July 15, 16, 17.

Minnesota State Dental Association, St. Paul, Sept. 1, 2, 3.

New Jersey State Dental Society, Asbury Park, July 16, 17, 18.

Nova Scotia Dental Association, Truro, Sept. 23, 24.

Ohio State Dental Society, Columbus, Dec. 2, 3, 4.

Pennsylvania State Dental Society, Bedford Springs, July 8, 9, 10.

Rhode Island Dental Society, July 8.

Tennessee Dental Association, Monteagle, July 1.

Wisconsin State Dental Society, Milwaukee, July 15, 16, 17.

National Dental Association.

The Sixth Annual Session will be held in Niagara Falls, N. Y., July 28 to 31.

A good programme is being prepared and a large and profitable meeting is anticipated.

A rate of one fare and a third for the round trip, on the certificate

plan, has been secured on all roads in the United States and part of Canada.

In purchasing ticket going, full fare must be paid and a railroad *certificate* taken. This, when properly signed, entitles holder to return for one-third fare.

Tickets may be bought going from July 22 to 29. The certificates for return journey may be used as late as August 4.

Chicago. A. H. PECK, Recording Secretary.

The American Dental Society of Europe.

The next meeting of the American Dental Society of Europe will be held in Stockholm, August 12 to 15, inclusive. A cordial invitation is extended to the profession to meet with us.

This date will enable those attending the National at Niagara, July 28 to 31, to be present by sailing via Hamburg after that meeting.

Owing to the heavy booking of steamer berths it would be well for intending voyagers to secure their return passages in advance. The best way to reach Stockholm is via Hamburg.

(1) Travel tickets only for the journey: Hamburg, Kiel, Corsor, Copenhagen, Malmo, Stockholm, return to Hamburg by the same route, £6.14.3 ($32.69) per adult, first class; £5.5.3 ($25.63) per adult, second class.

(2) Travel tickets only for the route: Hamburg, Lubeck and steamer direct to Stockholm, returning to Hamburg by the same route, £4.4.3 ($20.51) per adult, first class; £3.4.9 ($15.76) per adult, second class.

In the case of route No. 1 the validity is forty-five days—and for route No. 2 the season. As much notice as possible should be given to secure accommodation. The times between Hamburg and Stockholm are as follows:

Route No. 1.—Depart Hamburg, 8.53 a. m. or 11.07 p. m.; arrive Copenhagen, 6.45 p. m. or 10.05 a. m.; depart Copenhagen, 7.45 p. m. or 11.15 a. m.; arrive Stockholm, 11.25 a. m. or 6.45 a. m.

Route No. 2.—Depart Hamburg, 12 noon, 2 p. m. or 3.40 p. m.; arrive Lubeck, 1.21 p. m., 3.32 p. m. or 4.53 p. m.; depart Lubeck, about 6.15 p. m. Wednesdays and Saturdays, occupying about forty-two hours, but times for the coming season not yet fixed.

Any further information that may be desired can be obtained from Messrs. Cook & Sons, 261 and 262 Broadway, New York.

L. J. MITCHELL, Hon. Sec'y.

39 Upper Brook St., London, W. Eng.

Minnesota State Dental Association.

The nineteenth annual meeting of the Minnesota State Dental Association will be held at St. Paul, Minn., on Sept. 1, 2, 3, 1902. A cordial invitation is extended to all members of the profession.

Lake City, Minn. GEO. S. TODD, Sec'y.

Dental Association of the Province of Nova Scotia.

The twelfth annual convention of the Dental Association of the Province of Nova Scotia will be held at Truro, N. S., Sept. 23 and 24, 1902. A cordial invitation is extended to all interested in dentistry.

F. M. RYAN, Sec'y.

Canadian Dental Association.

The first meeting of all the dentists of Canada will be held in Montreal, Sept. 16, 17 and 18, 1902. A National Dental Association and a Board of Dental Examiners will be organized. Some of the most eminent dentists in America will be present. The profession is invited. Dental dealers desiring to make an exhibit of dental goods may have space allotted them by applying to the Secretary.

EUDORE DUBEAN, D.D.S., Sec'y.

396 St. Denis St., Montreal, Canada.

The Texas State Dental Association.

The Texas State Dental Association met in the city of Waco, May 13, 14 and 15, and held a very fine meeting.

The attendance was large; the papers and clinics were of a high order.

The following is a list of the officers elected for the next year: Dr. J. G. Fife, Dallas, president; Dr. Thos. P. Williams, Houston, 1st vice-president; Dr. R. D. Griffis, Paris, 2d vice-president; Dr. Bush Jones, Dallas, secretary and treasurer; Dr. A. F. Sontag, Waco, curator of museum. *Executive Committee*: Dr. W. R. Rathbone, chairman, Cuero; Dr. A. J. Beville, Waco; Dr. C. O. Webb, Crockett.

The next meeting will be held in the city of Houston, May, 1903.

New York State Dental Society.

At the annual meeting of the New York State Dental Society, held at the Hotel Ten-Eyck, Albany, N. Y., May 14 and 15, 1902, the following officers were elected for the coming year: President, R. H. Hofheinz, of Rochester; Vice-President, W. J. Turner, of Brooklyn; Secretary, W. A. White, of Phelps; Treasurer, C. W. Stainton, of Buffalo; Correspondent, H. D. Hatch, of New York.

Virginia State Dental Association.

The Virginia State Dental Association will meet at the Hygeia Hotel, Old Point Comfort, Va., August 5, 6 and 7, 1902.

Visiting dentists will be cordially welcomed.

Richmond, Va. J. HALL MOORE, Cor. Secy.

Pennsylvania State Dental Society.

The Pennsylvania State Dental Society will hold its regular annual meeting at Bedford Springs Hotel, Bedford, Pa., July 8, 9 and 10.

R. H. NONES, Chairman Executive Committe.

1708 Chestnut Street, Philadelphia, Pa.

Missouri State Dental Association.

At the last annual meeting of this Association, held at Jefferson City, May 21, 22, 23, 1902, the following officers and committees were elected: President, S. C. A. Rubey of Clinton; 1st Vice-President, J. H. Kennerly of St. Louis; 2d Vice-President, F. W. Franklin of Kansas City; Corresponding Secretary, Otto J. Fruth of St. Louis; Recording Secretary, H. H. Sullivan of Kansas City; Treasurer, J. T. Fry of Moberly.

Board of Censors: A. M. McGee of Louisiana; R. J. Winne of Bolivar; W. M. Bartlett of St. Louis.

Committee on Ethics: A. J. Prosser of St. Louis; W. H. Renoe of Fulton; J. B. McBride of Springfield.

Publication Committee: Wm. Conrad of St. Louis; W. G. Goodrich of Chillicothe.

Committee on History: Burton Lee Thorpe of St. Louis.

Committee on Inventions and New Appliances: Sam. T. Bassett of St. Louis.

Committee on International Dental Congress During Louisiana Purchase Exposition: Wm. Conrad, F. F. Fletcher, M. C. Marshall, Hermann Prinz, Burton Lee Thorpe, W. M. Bartlett, Leo Gregory McKellops.

Next annual meeting to be held at Kansas City, Mo.

OTTO J. FRUTH, Corresponding Secy.

National Association of Dental Examiners.

The nineteenth annual session will convene at the International Hotel, Niagara Falls, on Friday, July 25, at 10 a. m., and continue in session until adjournment.

It is earnestly hoped that this session will see a larger representation of delegates than any heretofore held.

Every State is asked to make provision now to send delegates.

Niagara Falls is an ideal place for meeting, and the International Hotel is the best, the service and appointments first class, and the rates will be according to location of the room. Rates from $3.50 to $4.50 per day, being a reduction of fifty cents per day from the regular rates.

It is expected the usual reduction in railroad fare will be arranged in time.

J. ALLEN OSMUN, Secy.

588 Broad Street, Newark, N. J.